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May 10, 2017

Geoff Merrell
State On-Scene Coordinator
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Re: Middle Ground Shoal Platform, Natural Gas Pipeline Release
Middle Ground Shoal Gas Leak Sampling and Monitoring Plan Summary Report
Sampling Period #8 ending 05/09/2017

Dear Mr. Merrell:

Hilcorp Alaska, LLC ("Hilcorp") submitted the Middle Ground Shoal Gas Leak Sampling and Monitoring Plan ("Plan") to the Department of Environmental Conservation ("Department") on March 8, 2017. Preliminary approval to implement the Plan was provided by the Department on March 10, 2017. As described in Section 3.2 of the Plan, Hilcorp is submitting this eighth weekly summary report to the Department.

In an effort to provide data to the Department as quickly as possible, a complete and thorough quality control evaluation has not been completed at this time. Please note that all data presented in this report is preliminary and should be considered as such until a quality control evaluation is completed. Hilcorp will continue to evaluate data quality and will notify the Department of any significant issues as soon as possible.

Ice Monitoring:

Hilcorp regularly monitored ice conditions in the area of the gas leak using helicopter overflights and platform observations as conditions allowed. Observations were compared to the National Oceanic and Atmospheric Administration (NOAA) ice forecasts and provided to the Department via Situation Reports.

On April 17, 2017, Hilcorp submitted an Amendment to the Department to stop daily ice monitoring efforts due to warmer temperatures. The Amendment was accepted by the Department on April 18, 2017. Ice monitoring activities described in the Plan are considered complete.

Fish and Wildlife Monitoring:

On May 3, one Cook Inlet Spill Prevention & Response, Inc. (CISPRI) protected species observer and one wildlife observer professional from International Bird Rescue conducted an extended overflight of approximately 20 square miles surrounding the location of the former gas leak (within a 5-mile diameter

circle). The helicopter was able to fly at approximately 300 feet altitude in circles approximately 0.5 miles apart. To avoid incidental harassment of marine mammals, altitude would have been increased to 1500 feet if marine mammals were spotted. Flight conditions and visibility were good during the flight. Gulls were observed flying within the 20 square mile area.

Wildlife observer reports are provided in Attachment A. Fish and wildlife monitoring activities described in the Plan are considered complete.

Water Quality Sampling:

The water quality buoy was successfully deployed two times on May 2, 2017. The water quality buoy was equipped with sensors to monitor temperature, pH, salinity, ORP, conductivity, relative conductivity, and concentrations of dissolved oxygen and methane. During Sampling Period #7, the buoy was tethered to the deck to allow for periodic adjustment of the buoy's travel path. This method of deployment reduced the depth of the instruments in the water column to 1, 6, and 11.5 meters below the water surface.

Water quality sampling during Sampling Period #8 showed limited variability in dissolved oxygen, methane, and carbon dioxide concentrations. The lowest dissolved oxygen reading observed (11.1 mg/L) was well above the water quality standard specified under 18 AAC 70 for marine waters. The highest methane concentration observed was 0.098 mg/L at 6 meters below the water surface. No violations of state water quality standards were identified.

Discrete water samples were collected for analysis of methane and carbon dioxide at three depths using Niskin bottles at three locations. Methane was not detected in any of the samples and carbon dioxide concentrations ranged between 0.0019 and 0.21 mg/L.

Absolute total dissolved gas (TDG) saturation was calculated using the maximum TDG pressure readings from all eight weeks of sampling. Maximum TDG saturation ranged from 45% to 103.2%. No violations of state water quality standards were identified.

A summary report and additional safety documentation for the water quality sampling efforts are provided in Attachment B. Water quality sampling efforts described in the Plan are considered complete.

Air/Water Interface Sampling:

Air/Water Interface Sampling was conducted on May 2, 2017. The air/water interface buoy was equipped with sensors to monitor concentrations of carbon dioxide and oxygen at the air/water interface. The air/water interface buoy was also equipped with sensors to monitor dissolved methane, temperature, conductivity, dissolved oxygen, and salinity in water at a depth of 1.5 to 1.75 meters below the water surface.

One drift with the air/water interface buoy was completed as the tide was transitioning from flood tide to slack tide to ebb tide. GPS coordinates indicate the buoy traversed as close as 164 meters from the former leak location. Methane readings during the first 52 minutes of the drift were erratic and considered invalid.

Subsequent methane concentrations were less than 20 ppm. Actual air measurements obtained for lower explosive limit and carbon dioxide were below the sensitivity of the sensors.

Three four-gas meters were used to monitor air conditions continuously to establish a safe work zone during all vessel-based sampling efforts. Lower Explosive Limit (LEL) readings from the meters did not exceed 0%.

A summary report and additional safety documentation for the air/water interface sampling efforts are provided in Attachment B. Air/water interface sampling efforts described in the Plan are considered complete.

Acoustic Monitoring:

Acoustic monitoring described in the Plan was conducted previously on Sunday March, 27, 2017. A second acoustic monitoring effort using Autonomous Multichannel Acoustic Recorders (AMARs) was conducted between April 7, 2017 and April 22, 2017. On April 17, 2017, Hilcorp submitted an Amendment to the Department to submit this additional acoustic monitoring data as part of the Plan. The Amendment was accepted by the Department on April 18, 2017. Field activities associated with acoustic monitoring described in the Plan are considered complete. Acoustic data is currently being evaluated and anticipated to be submitted to the Department on May 17, 2017.

If you have any questions or concerns regarding this letter, please feel free to contact either myself or the appropriate Hilcorp staff member as we continue to work with you on our ongoing response to this event.

Sincerely,

A handwritten signature in blue ink, appearing to read 'W. G. Britt, Jr.', is written over a horizontal line.

William G. Britt, Jr.
Environmental Manager

Attachments:

- Attachment A: Fish and Wildlife Monitoring Summary Reports
- Attachment B: Water Quality Sampling Summary Report

ATTACHMENT A
FISH AND WILDLIFE MONITORING SUMMARY REPORT

Cook Inlet Methane Pipeline Leak Area

Water Quality and Air/Water Interface Monitoring

Weekly Report #8

Prepared by SLR International Corporation (SLR)

Report Date: 5-9-2017

1.0 OVERVIEW

The eighth water quality monitoring event was conducted from aboard the Offshore Service Vessel (OSV) Resolution during this reporting period using the approaches and methods described in the ADEC-approved plan (SLR 2017a). There was no air/water interface sampling this reporting period.

Safety of the vessel and crew was top priority during the monitoring activities. The quantity and location of sampling events were determined by site and weather conditions. The data presented herein is preliminary, subject to further review and verification by SLR International Corporation (SLR).

The revised location of the methane leak provided by Hilcorp prior to the first monitoring event on March 18 was used for the purposes of monitoring and reporting. This revised location and corresponding water depth is:

- Latitude 151°26'01.84"W, Longitude 60°46'35.68"N
- Easting 1384137.82, Northing: 2478537.39
- Water Depth (MLLW) = 21.18 meters (69.51 feet)

This location is referred to as the Methane Release Point (MRP). Initial estimates of the leak rate ranged from 203 to 300 thousand cubic feet per day (MCFD). On March 13, Hilcorp reduced the pressure in the line and reported the gas flow rate from the leak was 193 to 215 MCFD. On March 25, 2017, the leak rate was further reduced to 85 to 115 MCFD. On April 10, the flow rate was further reduced to a reported rate of 78 to 108 MCFD. On April 13, the leak was stopped by applying a temporary clamp over the hole in the gas line. The temporary clamp was removed on April 19 during the slack tide around mid-day to allow for the installation of the permanent clamp. This operation took several dives during slack water. During the installation of the permanent clamp there was intermittent gas leakage from the pipeline as it could only be partially tightened. The permanent clamp failed to stop all the leakage and the temporary clamp was re-installed on April 20. The temporary clamp stopped the gas leakage.

As discussed in Section 2.2 of this report, based on the preliminary data review completed to date, the dissolved oxygen (DO) concentrations measured during this event and the previous events did not violate the Alaska Water Quality Standards (AWQS) as established in Title 18 Alaska Administrative Code (AAC), Chapter 75 (18 AAC 70).

2.0 WATER QUALITY MONITORING

2.1 Activities Completed

Water quality monitoring and sampling was conducted on May 2, 2017 which was one day prior to a neap tide on May 3. The May 2 monitoring event covered portions of an ebb and flood tide. The NOAA tide predictions at the nearby East Forelands area predicted a high tide at 10:12 with height of 5.97 meters above mean lower low water (MLLW) on May 2. At the MRP site, the tide changes about 50 minutes after NOAA tidal predictions for the East Forelands area, and drifts were planned accordingly. The field team consisted of one SLR and one Kinnetic Laboratories, Inc. (KLI) scientist. The field team members (samplers) were Alaska Department of Environmental Conservation (ADEC) qualified samplers, per 18 Alaska Administrative Code 75.

The data collection activities followed the Water Quality Cook Inlet Alaska Methane Pipeline Leak Water Quality Sampling Plan (WQ Plan), (SLR 2017a). The primary data collection method utilized a drifting instrumented buoy to obtain water quality parameters in the area of interest. The drifting buoy had multiple instruments suspended along a line at three depth intervals (2, 7 and 12.5 meters) as depicted on Figure 1. The primary instruments are listed below:

- SeaBird Electronics, SBE 19 plus V2 SeaCAT- conductivity, depth, temperature (CTD), with dissolved oxygen (DO), pH, and turbidity.
- Pro-Oceanus Mini Methane
- Pro-Oceanus Mini Carbon Dioxide
- PME MiniDOT
- Garmin WAAS differential global positioning system (mounted on buoy and used to track the buoy's position during a monitoring transect)

Reported instrument depths below the water surface (bws) are based on length of line from the bottom of the buoy to the instrument(s). The buoy drifted with the current so the instrument string maintained a near vertical position during deployment. This was verified by review of the depth reading obtained by the CTD, which was located at the end of the line. As with Weeks 4, 5, 6 and 7, during Week 8 the buoy was tethered to the deck of the boat, allowing for periodic adjustment of the buoy's travel path throughout the drift to better intercept the MRP. This method of deployment raised the buoy 1 meter above the water surface, and thus reduced the depth of the instruments in the water column a similar amount. Monitoring depths for this reporting period were approximately 1, 6 and 11.5 meters bws. A summary of the parameters measured by each instrument and frequency is provided in Attachment A, Table A-1.

During event 8, the site conditions impacted the activities completed as well as the collection of data, as noted below:

- No dive crew or buoys were near the MRP, therefore drifts could proceed without danger of entanglement in buoy lines.
- No sea ice was encountered during the eighth event.
- The wind was 15 to 20 knots. Waves were up to 1 meter in height. The wind interfered with the projected drift pattern on the first drift.
- Air temperatures varied between 4 and 8 °C with water temperatures about 2.3 to 2.6 °C.
- The MiniCH₄ and MiniCO₂ sensors at both depths were mounted with the membrane facing the water's surface as precautionary measure to prevent gas bubbles from the MRP becoming trapped within the enclosure surrounding the membrane. Prior to the Week 4 event, these sensors had been mounted with the membrane facing toward the seafloor. Starting on Week 5, the deeper (12 meter) sensor was mounted upward as well.
- The deep and middle depth sensors were soaked in a container of seawater prior to and between drifts to keep them closer to ambient conditions when deployed. The sea water was collected from Cook Inlet prior the first drift near the project site. This technique was used the previous two weeks as well, and appeared to reduce the sensors' equilibrium time following deployment.

Two water quality buoy drifts (monitoring transects) were attempted through the area surrounding the MRP on May 2 at differing tidal stages. The duration of each water quality buoy drift varied from approximately 27 to 58 minutes. The average drift speed was 1.2 and 3.2 kilometers per hour for Drifts #1 and #2. Table A-2 in Attachment A provides a summary of the buoy deployments. Attachment A. Figure A-2h illustrates the path of the two buoy drifts. During both drifts the temporary clamp was installed on the natural gas line and no gas was observed bubbling around the MRP.

Drift #1 occurred during the flood tide. The buoy was deployed attached to the vessel approximately 570 meters up current of the MRP and was allowed to drift down current. However, the wind pushed vessel off course and the drift veered to northwest away from the MRP. The drift was terminated after approximately 28 minutes without passing down current of the MRP.

Drift #2 occurred during the ebb tide. Although the intent was to release the buoy upcurrent of the MRP, the drift began slightly (77 meters) down current of the MRP. The buoy drifted down current a total of 3113 meters before the drift was terminated after 57 minutes.

In addition, water samples for laboratory analysis were collected at three depths (surface, middle deep) using Niskin bottles three times on May 2. The first set of samples was collected during flood tide 641 meters down current from the MRP (CW06). The second set of samples was collected near slack (high) tide directly over the MRP (CW07). The third set of samples was collected during ebb tide 357 meters down current from the MRP (CW08). Figure A-3 illustrates the sample locations. A total of nine primary samples, plus one sample duplicate and extra volume from one sample for matrix spike and matrix spike duplicate analysis were collected and sent to the analytical laboratory (ALS Environmental in Simi Valley, California) for analysis of CH₄ and CO₂.

No CTD casts were performed during Week 8.

A photograph log documenting the data collection methods and site conditions during Week 8 is included in Attachment A.

2.2 Summary of Results

2.2.1 Buoy Transects-Week 7

Data plots for the primary parameters of interest (DO, CH₄ and CO₂) for the water quality buoy Drift #2 completed on May 2 are provided on Figures A-11.1a, b and c in Attachment A. Drift #1 was terminated prior to passing down current of the MRP when it became evident the buoy would not come close to the MRP. The data obtained during Drift #1 was not considered relevant for analysis or reporting purposes, and is not discussed.

- **Dissolved Oxygen:** The lowest DO value recorded after the sensor had time to stabilize down current of the MRP was 11.1 mg/L during Drift #2. The lowest DO values were recorded on the deepest DO sensor deployed at 11.5 meters on the CTD, which has been typical during the monitoring program. There was no significant drop in DO concentrations recorded by the sensors during Drift 2. The measurements from the three sensors were relatively stable throughout the drift (Attachment A, Figure A-11.1a).
- **Dissolved Methane:** The maximum CH₄ concentration recorded was 0.098 mg/L during Drift #2. This measurement was recorded on the sensor deployed at 6 meters. The sensor at 11.5 meters recorded values about 0.05 mg/L less than the sensor at 6 meters which has been a typical pattern observed during the monitoring events. The recorded CH₄ concentrations were relatively stable and consistent throughout the drifts (Attachment A, Figure A-11.1b). The recorded CH₄ concentrations were similar to the previous five weeks (March 29-April 25 events). Higher dissolved CH₄ values were only recorded during drifts passing within 5 meters of the MRP during the first two weeks of monitoring.
- **Dissolved Carbon Dioxide:** CO₂ concentrations recorded during Drifts #2 did not show any significant fluctuation (Figure A-11.1c in Attachment A). The recorded concentrations varied the most during the initial 10 minutes of the drift, presumably as the instrument equilibrated with the water conditions. The measured CO₂ concentrations were typically between 0.7 and 1.2 mg/L, which is consistent with the values recorded during the 8 weeks of monitoring.

As during previous weeks, the lowest DO concentration measured was well above the most stringent regulatory limit for DO in marine waters established in 18 AAC 70. The 18 AAC 70 Alaska Water Quality Standards for marine waters state the surface DO concentration in coastal waters may not be less than 6.0 mg/L for a depth of one meter except when natural conditions cause this value to be depressed. DO may not be reduced below 4 mg/L at any point beneath the surface. DO concentrations in estuaries and tidal tributaries may not be less than 5.0 mg/L except where natural conditions cause this value to be depressed.

2.2.2 Laboratory Results

Laboratory sample results for dissolved CH₄ and CO₂ from the May 2 sample event were analyzed on a rapid turnaround by ALS Environmental in Simi Valley, California (ALS). ALS maintains National Environmental Laboratory Accreditation Program (NELAP) and Department of Defense Environmental Laboratory Accreditation Program certification for CH₄ and CO₂ analysis (method RSK 175). The analytical results are provided in Table A-3 in Attachment A (see Sample IDs CW05S,M,D CW07S,M,D and CWO8S,M,D). Based on a preliminary review of the data, no data required qualification.

As shown in Table A-3 in Attachment A, the CH₄ concentrations were all non-detectable with a method reporting limit (MRL) of 0.0013 mg/L. Past sample events when the release was active had typically detected methane in the samples with concentrations ranging from 0.0019 to 0.21 mg/L.

CO₂ was detected in all of the laboratory samples at concentrations ranging from 1.2 to 2 mg/L. These values were similar to the concentrations detected during the prior sample events as shown on Table A-3. The similarity in values over the eight week monitoring period when the release was both active and inactive, suggests the methane release was not significantly changing CO₂ concentrations from typical ambient conditions.

2.2.3 Total Dissolved Gas Calculations

In addition to DO, the Alaska water quality standards (AWQS) contained in 18 AAC 70.20(b)(A)(15) have water quality criteria for total dissolved gas (TDG). For marine water the concentration of TDG may not exceed 110% of saturation at any point of sample collection.

2.2.3.1 Methods

Dissolved gas concentrations were measured throughout the monitoring events by the Pro-Oceanus MiniCH₄ and MiniCO₂ instruments. As discussed in the sampling plan (SLR 2017a), these instruments operate through diffusion of dissolved gases from liquid through a support semi-permeable membrane into a detector cell. The instruments are designed to measure the mole fraction of the respective gases (methane or carbon dioxide) within the detector cell. However, in addition to measuring the mole fraction of a given gas, the instruments measure the total dissolved gas pressure (TDGP) through a pressure sensor mounted within the detector cell (Pro-Oceanus). Conceptually, TDGP is a more general measurement which represents the sum of the pressures of all constituent dissolved gases.

To determine if the AQWS for TDG saturation was exceeded during the eight monitoring program, the TDGP provided by the Pro-Oceanus instruments was used to calculate the absolute TDG saturation using the equation below (Weitkamp 2008) following methods:

$$TDG\ Saturation = \frac{TDGP}{Hydrostatic\ Pressure + Atmospheric\ Pressure} * 100\%$$

- Atmospheric pressure was recorded from a nearby weather station in Nikiski, Alaska;

- Hydrostatic pressure was calculated based on the depth of the water column above the sensor; which was estimated from the depth measurements made by the CTD and the length of rope between each instrument;
- Hydrostatic pressure was also adjusted for the variability in the density of seawater, due to salinity and temperature changes, using the seawater density equation from Gill 1982; which is not pressure corrected; and
- For each drift, the average salinity and temperature was used to calculate the seawater density.

Using these equations and methods, the maximum TDG saturation during each drift was calculated for each instrument (CH₄ and CO₂) and each depth (middle and deep). The maximum TDG saturation was calculated by using the highest TDGP measurement within each drift, irrespective of the time or location at which the measurement was recorded. The highest TDGP was used as a conservative measure to report highest possible TDG saturation per drift.

2.2.3.2 Results

The maximum TDG saturation calculated per drift and instrument is presented in Table A-4. As shown, all TDG saturation measurements for the entire monitoring project were less than the regulatory criteria of 110%, with the highest TDG of 103.2% on the mid depth MiniCO₂ during Event 2, Drift 3; which corresponds to an absolute TDG pressure of 1766 millibar. This measurement occurred 53 minutes into the drift at a distance of 189 meter down current of the MRP. In general, maximum saturations ranged from 45% to 103.2%, which corresponds to a TDG pressure range of 1002 to 1766 millibar. As discussed, these are the maximum values recorded per drift so the majority of readings were less than values shown on Table A-14.

In addition, the maximum TDG saturation was compared to elapsed time at which it occurred during each drift through the use of histograms (Figure A-12). As shown on Figure A-12, the majority of the maximums occurred within the first 5 minutes of the drift. These initial maximum readings are unlikely to be representative of the true conditions, because the instrument had insufficient time to equilibrate to the water conditions. Thus, the actual maximum TDG saturation per drift was likely less than listed on Table A-4 for any drifts where it occurred during the first 5 minutes.

An initial TDG pressure increase is to be expected immediately after deployment. Prior to deployment in the water, the instrument membrane may not be fully compressed against its support. Upon deployment, the membrane will be flattened by the hydrostatic pressure leading to a temporarily elevated TDG pressure as the gas in the detector cell is compressed (Pro-Oceanus). While the excess pressure is released via diffusion through the membrane, readings may not be within the specified accuracy (Pro-Oceanus). Thus, the instrument must have sufficient time to appropriately equilibrate for measurements to be representative of the actual site conditions.

2.3 Activities Planned for the Next Sampling Event

The temporary pipeline repair clamp was initially installed on April 13, 2017 and successfully reinstalled on April 21, 2017. Although the permanent clamp installation is pending, additional uncontrolled release of methane is not expected. Therefore, this Water Quality sampling event

completes the commitment made in the Sampling Work Plan to conduct sampling for two weeks following installation of the temporary clamp.

3.0 AIR/WATER INTERFACE MONITORING

3.1 Activities Completed

The Air / Water Interface sampling was conducted on May 2, 2017. The field team consisted of one SLR scientist. Prior to sampling, the sensor calibration and integrity was assessed to verify acceptable performance. Sensors were found to be responding appropriately. SLR continued to monitor the performance of the replacement dissolved CH₄ sensor to confirm acceptable behavior.

The data collection activities followed the Air / Water Interface Sampling Plan. The primary data collection method utilized a drifting instrumented buoy to obtain Air / Water quality parameters in the area of interest. The primary instruments are listed below and shown on Figure B1: Air / Water Interface Buoy Schematic:

- RKI Instruments S2 LEL Transmitter / Detector – collects data every minute
- RKI Instruments S2 LEL Methane (CH₄) Transmitter / Detector – collects data every minute
- RKI Instruments S2 Carbon Dioxide (CO₂) Transmitter / Detector – collects data every minute
- RKI Instruments S2 Oxygen (O₂) Transmitter / Detector – collects data every minute
- Pro-Oceanus Mini Methane (CH₄) - Submersible pCH₄ sensor and datalogger – collects data every minute
- In-Situ AquaTroll® 600 Multiparameter Sonde – Water temperature, conductivity, dissolved oxygen, salinity – collects data every minute
- Garmin WAAS differential global positioning system (mounted on buoy and used to track the buoy's position during a monitoring transect) – collects data every minute.

Conditions during the buoy launch were:

- The buoy launch was conducted during periods where the launch and transect areas contained zero ice.
- Air temperature varied between 6 and 7 °C.
- Water temperatures were approximately 2.3 °C.
- Winds were approximately 10 mph out of the north.
- Seas were swelling approximately 1 meter during the launch with occasional waves approximately 2 meters in height.

One buoy drift (monitoring transect) was completed through the area surrounding the MRP as the tide was finishing the flood tide and transitioned to ebb tide. The duration of the drift was 1 hour, 48 minutes. Plot of the drift transit path is illustrated on Figure B5 Air / Water Interface Sampling Events, Buoy Tracks May 2, 2017 in Attachment B. During the drift, the buoy passed approximately 164 meters from the MRP at its closest point. Table B19 Summary of Air / Water Interface Buoy Drifts May 2, 2017 in Attachment B provides a summary of the buoy deployment.

3.2 Preliminary Summary of Results

3.2.1 Event 1 Data Update

No changes to the previously reported data were made. The final, validated results for Event 1 are provided in Attachment B as Tables B2 through B7.

3.2.2 Event 2 Data Update

No changes to the previously reported data were made. The final, validated results for Event 2 are provided in Attachment B as Tables B9 through B13.

3.2.3 Event 3 Update

Event 3 data were reviewed and finalized without changes. The final, validated results for Event 3 are provided in Attachment B as Tables B15 through B18.

3.2.4 Event 4 Data

Due to the short period between the monitoring event and initial reporting date, all of the data collected during this sampling event has not been fully reviewed, analyzed and validated for reporting. A brief description of the buoy deployment is provided, followed by a general discussion of the preliminary results.

During Drift #1 the Air / Water Interface buoy was deployed at 10:42 am as the tide was transitioning from flood tide to slack tide to ebb tide up current from the MRP. It was retrieved 1 hour and 48 minutes later down current of the MRP. During the drift, the buoy passed west of the MRP. At its closest point, the buoy came within 164 meters of the estimated MRP. CH₄ in air was detected in most of the launch observations. Those detections are described in section 3.2.5 below. Table B20 in Attachment B provides a summary of measurements obtained during the buoy deployment.

3.2.5 Event 4 Data – Discussion of Preliminary Results

The dissolved CH₄ sensor performed acceptably. The sensor did not record erratic or anomalous readings during the launch confirming that the repair resolved previous concerns. All measurements obtained during the launch were below the sensor minimum detectable level.

Erratic CH₄ in air concentrations as observed and described in previous reports were also observed during the May 2, 2017 drift. Concentrations of CH₄ in air recorded during the drift (over a 1.7 mile span) ranged from below the detectable limit to a maximum of 55 ppm. Concentration recordings of 33 ppm were recorded frequently in the early stage of the drift but gradually reduced in frequency until all measurements were below the lower detectable limit.

As noted in the Event 2 and Event 3 reports, the CH₄ in air sensor is known to be very sensitive to changes in ambient temperature. Corrective procedures were implemented to zero the sensor prior to the launch and an attempt was made to allow the buoy to acclimate to ambient air and water temperature conditions prior to the launch; however due to deteriorating sea conditions, the buoy may not have fully acclimated to stable temperature conditions. As a result, the erratic CH₄ in air measurements could be explained as resulting from insufficient thermal equilibration of the buoy.

Discussions with the field team revealed that the buoy briefly submerged as it was being lowered to the water due to relatively high waves at the time of the launch. Infiltration of sea water into the sensor could also explain the erratic CH₄ in air observations and is the more likely cause of the erratic measurements. Trends in the data observed during Event 3 revealed a gradual drift over time in temperature, specific conductance, and salinity measurements that were determined to be indicative of insufficient thermal equilibration. These trends are not apparent in the Event 4 data. Additionally, the erratic CH₄ in air observations are most apparent in the first 52 minutes of the drift after which time concentration recordings are below the sensor detectable limit. This information suggests water infiltration is a more likely explanation as any water that infiltrated the sensor would slowly dry over time resulting in fewer erratic measurements as was observed. Because of the uncertainty associated with the erratic measurements, and the likelihood that they were impacted by water infiltration into the sensor, CH₄ in air concentrations collected during the first 52 minutes of the launch are reported as invalid measurements.

Actual air measurements obtained for LEL and carbon dioxide (CO₂) revealed results below the sensitivity of the sensors (lower limit of detection, LDL). Sensors for these parameters were originally selected to ensure quantitative measurement of potentially high concentrations associated with sampling directly at the MRP. All measurements below the LDL for these parameters are reported as less than the parameter-specific LDL.

- LEL: The LEL sensor was optimized after the March 26, 2017 deployment and the LDL was adjusted to 1%. LEL results indicate methane concentrations are below 1% (equates to 5,000 ppm CH₄), providing evidence of a safe work environment.
- CO₂: The LDL for CO₂ is 0.1% or 1,000 ppm. Established global background CO₂ concentrations are expected to be approximately 400 ppm. The current sensor provides the ability to characterize significant increases in CO₂ concentrations. No adjustment to the CO₂ sensor is planned.

3.3 Activities Planned for the Next Sampling Event

The temporary pipeline repair clamp was initially installed on April 13, 2017 and successfully reinstalled on April 21, 2017. Although the permanent clamp installation is pending, additional uncontrolled release of methane is not expected. Therefore, this Air / Water interface sampling event completes the commitment made in the Sampling Work Plan to conduct sampling for two weeks after installation of the temporary clamp.

REFERENCES

Gill, A. E. 1982. Atmosphere-Ocean Dynamics, Academic Press, San Diego, CA

Pro-Oceanus Systems Inc. *Mini CO2 Digital Model User's Manual: Revision 2.0.1*. Jan. 2016.

SLR International Corporation (SLR). 2017a Water Quality Sampling Plan. Cook Inlet Alaska Methane Pipeline Leak, March 2017.

SLR. 2017b. Air/Interface Sampling Plan. Cook Inlet Alaska Methane Pipeline Leak, March 2017

Weitkamp. D. E. (2008). Total Dissolved Gas Supersaturation Biological Effects, Review of Literature 1980-2007. Parametrix, Bellevue, Washington, June 2008

ATTACHMENT A:

PHOTOGRAPH LOG:

Water Quality and Air/Water Interface Photograph Log (May 2, 2017)

TABLES:

Table A-1: Water Quality Buoy Instrumentation Summary, May 5, 2017

Table A-2: Summary of Water Quality Buoy Drifts

FIGURES:

Figure A-1: Water Quality Monitoring Buoy Schematic (March 23-May 2, 2017)

Figure A-2h: Water Quality Monitoring Week 8 (May 2, 2017), Buoy Drift Tracks

Figure A-3: Water Quality Monitoring, Water Sample Locations for Laboratory Analysis (Weeks 1-8)

Week 8 Data Plots:

Figure A-11.1a: Buoy Drift #2, May 2, 2017, Dissolved Oxygen

Figure A-11.1b: Buoy Drift #2, May 2, 2017, Dissolved Methane

Figure A-11.1c: Buoy Drift #2, May 2, 2107, Dissolved Carbon Dioxide

Figure A-12: Histogram of Elapsed Time during Buoy Drifts when Maximum TDG Saturation Occurred

Cook Inlet Water Quality and
Air/Water Interface Sampling
Photo Log: Week 8
5-2-17

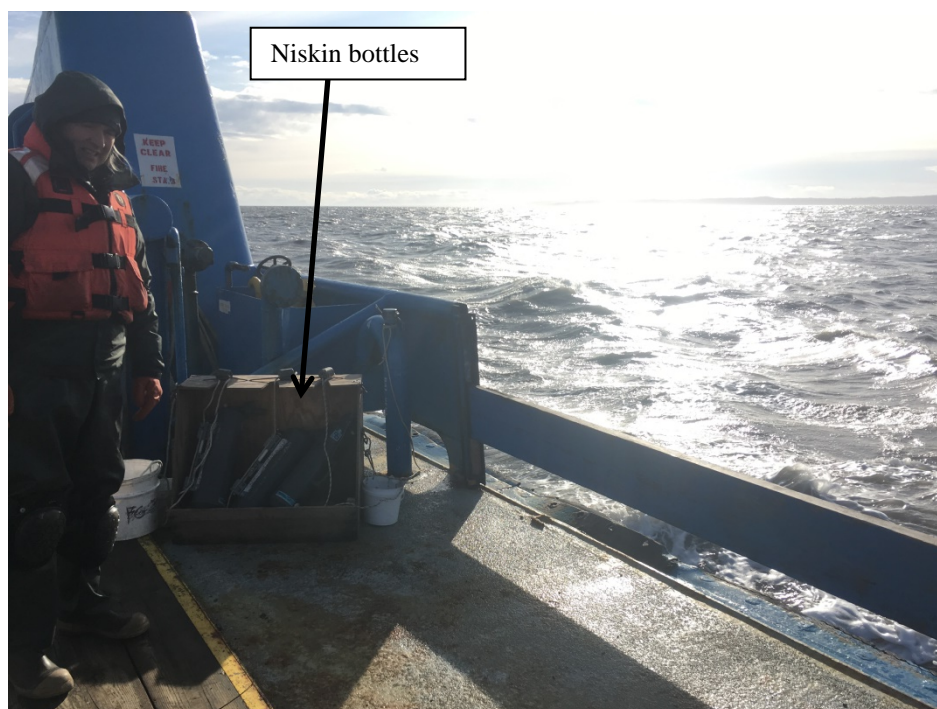


Photo 1:

Niskin bottles staged for sampling prior to collection at CW06, aboard the Champion.

Date:
5/2/2017

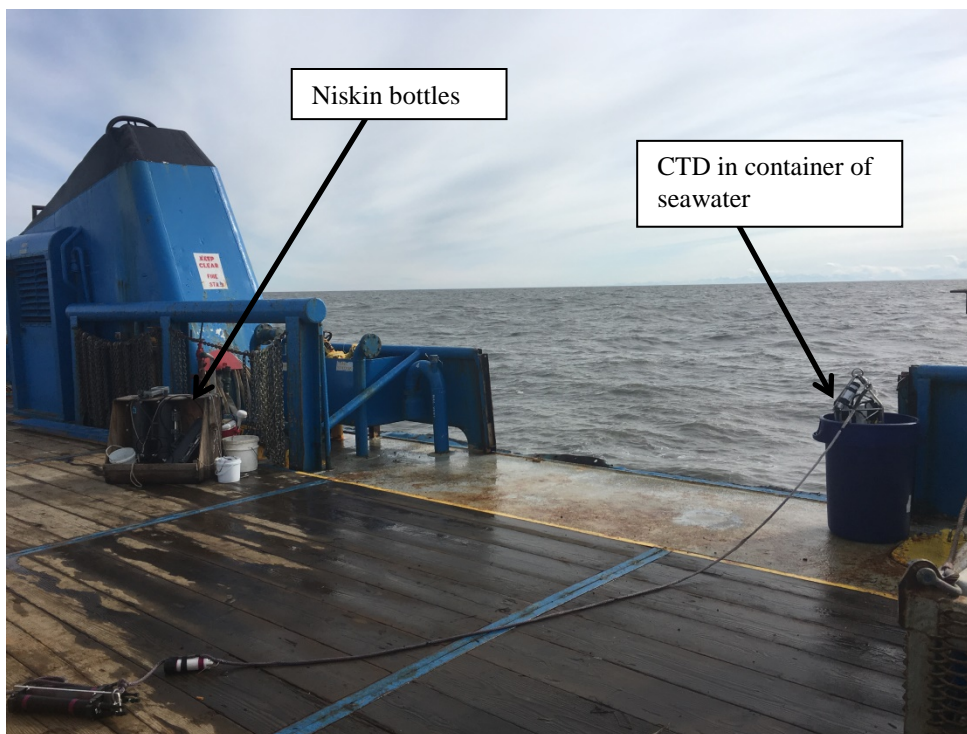


Photo 2:

CTD and mid-level sensors were stored in a container of seawater collected from Cook Inlet near the project site to keep them as close to in-situ conditions as possible between drifts. Niskin bottles are staged on the left.

Date:
5/2/2017



SITE PHOTOGRAPHS

Cook Inlet Alaska Methane Pipeline Leak
Water Quality Sampling Report: Week 8

Job No: 105.00874.17021

Table A-1: Water Quality Instrumentation Buoy Summary

Instrument Name	Parameters Measured	Measurement Unit	Measurement Frequency	Frequency Reported, Plotted on Data Analysis Figures	Notes
PME MiniDOT	Temperature	degrees Celsius (°C)	Once per minute	Once per minute	Unable to record at higher frequencies
	Dissolved Oxygen	milligrams per liter (mg/L)			
Pro-Oceanus MiniCO2 (0-1000ppm)	Partial pressure of CO2 in detector	Parts per million by volume (ppmv)	Once per 4 seconds	Once per 4 seconds	Note this is measured as a gaseous phase concentration, which is then converted to the surrounding aqueous concentrations.
	Detector total pressure	millibars			
	Detector temperature	degrees Celsius (°C)			
Pro-Oceanus MiniCH4 (two instruments utilized, with differing ranges 0-1% and 0-100%)	Partial pressure of CH4 in detector	Volume ratio (%)	Once per 4 seconds	Once per 4 seconds	Note this is measured as a gaseous phase concentration, which is then converted to the surrounding aqueous concentrations.
	Detector total pressure	millibars			
	Detector temperature	degrees Celsius			
Seabird SBE 19plus V3 SeaCat	Depth	meters (M)	1 per 1/4 second	Once per 4 seconds	Collected data is average to 4 second reporting frequency
	Pressure	decibar (dm)			
	Conductivity	Siemens per meter (S/m)			
	Temperature	degrees Celsius (°C)			
	pH	Negative of the base 10 logarithm of the molar concentration of hydrogen			
	Optical backscatter (OBS)	Nephelometric Turbidity Units (NTU)			
	Dissolved Oxygen	milligrams per liter (mg/L)			
Garmin WAAS	Position	Latitude and longitude	Once per 2 seconds	Once per 2 seconds	

Table A-2: Summary of Water Quality Buoy Drifts

Buoy Type	Instrument(s) Depth (m)	Drift Name	General Tide Description	Proximity to Spring or Neap Tide ¹	Daily Tidal Range (High-Low) (m)	Date	Release Location	Retrieval Location	Start of Data Collection (hr:min: sec) ²	End of Data Collection ²	Duration of Data Collection ²	Total Drift Distance (m) ²	Average Drift Velocity (km/hr) ²	Minimum Distance to MRP (m)	Drift Elapsed Time at Minimum Distance to MRP (hh:mm:ss)	Wind (knots & direction)	Wave Height (m)	Comments	Estimated flow from leak (MCFD)
Water Quality	Surface 7 Mid 7 Deep 12.5	D01-031817	Ebb	2 days before neap tide event	4.75	3/18/2017	60 46.622 N 60 45.356 N 151 25.718 W 151 27.877 W		14:52:20	15:09:55	0:17:35	1766	6.1	185.9	0:01:55	calm	0	CO2 sensor at 12.5 m unintentionally shut off, no data	193-295
Water Quality	Surface 2 Mid 7 Deep 12.5	D01-031917	Flood		3.84	3/19/2017	60 46.37 N 60 47.2 N 151 26.239 W 151 25.112 W		8:15:45	8:45:55	0:30:10	1930	3.8	44.9	0:05:10	15, SSW	0		
Water Quality	Surface 2 Mid 7 Deep 12.5	D02-031917	Flood			3/19/2017	60 46.35 N 60 46.921 N 151 25.878 W 151 25.878 W		9:09:40	9:36:55	0:27:15	901	2.0	165.8	0:14:40	15, SSW	0	SeaBird DO sensor stopped recording after 5 minutes, potential icing	
Water Quality	Surface 2 Mid 7 Deep 12.5	D03-031917	Flood/Slack/ Ebb		--	3/19/2017	60 45.527 N 60 45.527 N 151 23.097 W 151 23.097 W		9:58:00	11:57:30	1:59:30	3684	1.9	9.4	1:05:45	15, SSW	0.2		
Water Quality	Surface 2 Mid 7 Deep 12.5	D01-032317	Flood	3 days after neap tide event	3.08	3/23/2017	60 46.565 N 60 47.479 N 151 25.995 W 151 24.660 W		12:09:50	12:29:30	0:19:40	1675	5.1	71.2	0:00:05	0.4 SSW	0	SeaBird DO sensor clogged with ice, no 12.5 meter DO data	193-295
Water Quality	Surface 2 Mid 7 Deep 12.5	D02-032317	Flood			3/23/2017	60 46.393 N 60 47.755 N 151 26.33 W 151 26.248 W		13:10:40	13:54:55	0:44:15	3521	4.8	3.9	0:05:15	Calm	0	SeaBird DO sensor clogged with ice, no 12.5 meter DO data	
Water Quality	Surface 2 Mid 7 Deep 12.5	D03-032317	Flood/Slack/ Ebb		--	3/23/2017	60 46.781 N 60 46.537 N 151 25.884 W 151 26.248 W		15:29:55	16:24:30	0:54:35	675	0.36 (flood Tide) / 1.44 (Ebb Tide)	165.5	0:50:35	Calm	0		
Water Quality	Surface 2 Mid 7 Deep 12.5	D04-032317	Ebb		4.33	3/23/2017	60 46.695 N 60 45.403 N 151 25.870 W 151 27.936 W		16:31:35	17:18:55	0:47:20	3037	3.9	2.6	0:04:45	Calm	0		
Water Quality	Surface 2 Mid 7 Deep 12.5	D01-032917	Ebb	1 day after spring tide event	8.35	3/29/2017	60 46.725 N 60 44.322 N 151 25.624 W 151 29.507 W		11:07:24	11:45:36	0:38:12	5193	8.2	145.7	0:02:28	11, SW	0	Water pump for SeaBrid DO sensor clogged, no 12.5 m DO data	85-115
Water Quality	Surface 2 Mid 7 Deep 12.5	D02-032917	Flood		7.86	3/29/2017	60 46.216 N 60 49.189 N 151 26.734 W 151 21.302 W		15:54:32	16:46:56	0:52:24	6962	8.0	142.7	0:05:32	Calm	0	Water pump for SeaBrid DO sensor clogged, no 12.5 m DO data	
Water Quality	Surface 0.8 Mid 5.8 Deep 11.3	D01-040517	Flood	1 day after neap tide event	3.57	4/5/2017	60 46.618 N 60 46.654 N 151 26.228 W 151 25.531 W		13:26:48	13:48:08	0:21:20	793	2.5	67.8	0:08:00	5-10, SSW	0.5		85-115
Water Quality	Surface 0.8 Mid 5.8 Deep 11.3	D01-04057	Flood/Slack/ Ebb		--	4/5/2017	60 46.546 N 60 46.361 N 151 26.247 W 151 26.350 W		13:55:32	14:52:40	0:57:08	1094	0.72 (flood Tide) / 1.08 (Ebb Tide)	10.4	0:18:28	5-10, SSW	0.5		
Water Quality	Surface 1.5 Mid 6.5 Deep 12	D01-041217	Ebb	1 day after spring tide event	7.29	4/12/2017	60 47.025 N 60 44.665 N 151 25.319 W 151 29.450 W		11:21:08	12:09:20	0:48:12	6367	7.9	61.1	0:09:12	Calm	0		78-108
Water Quality	Surface 1.5 Mid 6.5 Deep 12	D02-041217	Flood		6.98	4/12/2017	60 46.071 N 60 47.572 N 151 25.526 W 151 25.366 W		15:31:36	15:57:32	0:25:56	3614	7.4	222.9	0:07:32	Calm	0		
Water Quality	Surface 1.5 Mid 6.5 Deep 12	D01-041917	Flood	neap tide	2.56	4/19/2017	60 46.039 N 60 48.26 N 151 26.973 W 151 23.275 W		9:32:48	11:18:36	1:45:48	5427	3.1	32.1	0:20:44	5, SSW	0.2	Temporary clamp was installed on pipeline leak on April 13, and in place during this drift.	0
Water Quality	Surface 1.5 Mid 6.5 Deep 12	D02-041917	Ebb		3.54	4/19/2017	60 46.944 N 60 45.000 N 151 25.555 W 151 28.091 W		13:05:44	14:16:16	1:10:32	4766	4.2	18.5	0:18:16	Calm	0.2	Temporary clamp was removed during this drift. Bubbling observed on water surface near MRP.	slight
Water Quality	Surface 1 Mid 6 Deep 11.5	D01-042517	Ebb	1 day before spring	7.01	4/25/2017	60 45.15 N 60 44.932 N 151 25.205 W 151 29.030 W		10:07:36	10:56:36	0:45:00	5978	9.7	29.6	0:12:48	5-10	0.3	Temporary clamp was re-installed on April 20 and in place during this event. No bubbling observed.	0
Water Quality	Surface 1 Mid 6 Deep 11.5	D02-042517	Flood		7.59	4/25/2017	60 46.043 N 60 46.754 N 151 27.426 W 151 26.097 W		13:08:12	13:24:56	0:16:44	1727	8.6	202.3	0:16:44	5-10	0.3	Drift terminated due to poor trajectory (missed MRP).	
Water Quality	Surface 1 Mid 6 Deep 11.5	D03-042517	Flood		7.59	4/25/2017	60 46.267 N 60 48.011 N 151 26.193 W 151 24.182 W		13:41:00	14:18:28	0:37:28	4007	8.8	27.9	0:06:24	10	0.3		
Water Quality	Surface 1 Mid 6 Deep 11.5	D01-050217	Flood	1 day before neap	4.54	5/2/2017	60 46.402 N 60 46.635 N 151 26.518 W 151 26.311 W		10:34:44	11:02:12	0:27:28	547	1.2	281.7	0:20:24	15-20, N	1		0
Water Quality	Surface 1 Mid 6 Deep 11.5	D02-050217	Ebb		5.37	5/2/2017	60 46.577 N 60 45.457 N 151 26.119 W 151 28.511 W		11:21:36	12:19:16	0:57:40	3113	3.2	76.8	0:00:00	15-20, N	0.5-1		

Abbreviations

m meters
MCFD thousand cubic feet per day
MRP Methane Release Point

Notes:

1 - Tidal information is from NOAA Tide Predictions for East Foreland, StationId:TWC1989

2-These times and corresponding statistics correspond to when the buoy instrument sensors reached deployment depth based on the CTD depth reading (12.5 meters) and when the instruments began to be retrieved at the end of the drift. This time interval corresponds to the time interval plotted on the figures.

**Table A-3: Water Sample Analytical Results
Methane Pipeline Leak Area, Cook Inlet, Alaska**

Sample ID	Date	Time	Sample Depth (m)	Depth to Bottom (m)	Sample Distance Down Current From MRP (m) ¹	Tide Stage (ebb,flood, or slack (+/-1hr)	Analytical Results	
							RSK 175 - methane (mg/L)	RSK 175 - carbon dioxide (mg/L)
CW01S	3/18/2017	1131	1	24	518	Ebb; ~6hr before slack	0.0024	1.4
CW01M	3/18/2017	1130	9				0.0026	1.4 MH
Primary: CW01D	3/18/2017	1130	23				0.0019	1.3
Duplicate: CW91D	3/18/2017	1130	23				0.0019	1.4
CW02S	3/18/2017	1613	1	20.6	741	Ebb; ~1hr before slack	ND [0.0013]	1.6
CW02M	3/18/2017	1615	6				ND [0.0013]	1.6
CW02D	3/18/2017	1617	12				0.0027	1.7
Primary: CW03S ²	3/23/2017	1418	1	24	177	Flood; ~2hr before slack tide	0.028	1.3
Duplicate: CW93S ²	3/23/2017	1418	1				0.031	1.6
CW03M ²	3/23/2017	1418	12				0.0075	1.5
CW04S ²	3/23/2017	1520	1	24	257	Flood; ~1hr before slack	0.014	1.7
CW04M ²	3/23/2017	1520	9				0.0092	1.5
CW04D ²	3/23/2017	1520	23.5				0.0017	1.7
Primary: CW05S ³	3/29/2017	1428	1	19.5	0	Slack	0.21	1.5
Duplicate: CW05A ³	3/29/2017	1428	1				0.18	1.5
CW05M ³	3/29/2017	1428	10				0.022	1.5
CW05D ³	3/29/2017	1428	19				ND [0.0013]	1.8
CW06S	5/2/2017	934	1	24	641	Flood; ~1.5 hours before high	ND [0.0013]	1.3 MH
Primary: CW06M	5/2/2017	934	12				ND [0.0013]	1.4
Duplicate: CW96M	5/2/2017	934	12				ND [0.0013]	1.4
CW06D	5/2/2017	934	24				ND [0.0013]	1.2
CW07S	5/2/2017	1117	1	27	14	Slack	ND [0.0013]	1.4
CW07M	5/2/2017	1117	12				ND [0.0013]	1.5
CW07D	5/2/2017	1117	27				ND [0.0013]	1.3
CW08S	5/2/2017	1258	1	26	357	Ebb; ~2 hours after high	ND [0.0013]	2
CW08M	5/2/2017	1258	12				ND [0.0013]	1.9
CW08D	5/2/2017	1258	26				ND [0.0013]	1.8

Notes:

- 1 - All samples collected down current of the MRP unless otherwise noted (including those listed as collected near slack tide)
- 2 - The carbon dioxide trip blank for this collection date was broken prior to sampling due to freezing.
- 3 - Sample was incorrectly identified as CW04 on chain of custody.

Abbreviations:

"_" parameter was not measured
m meters
mg/L milligrams per liter
MRP Methane Release Point

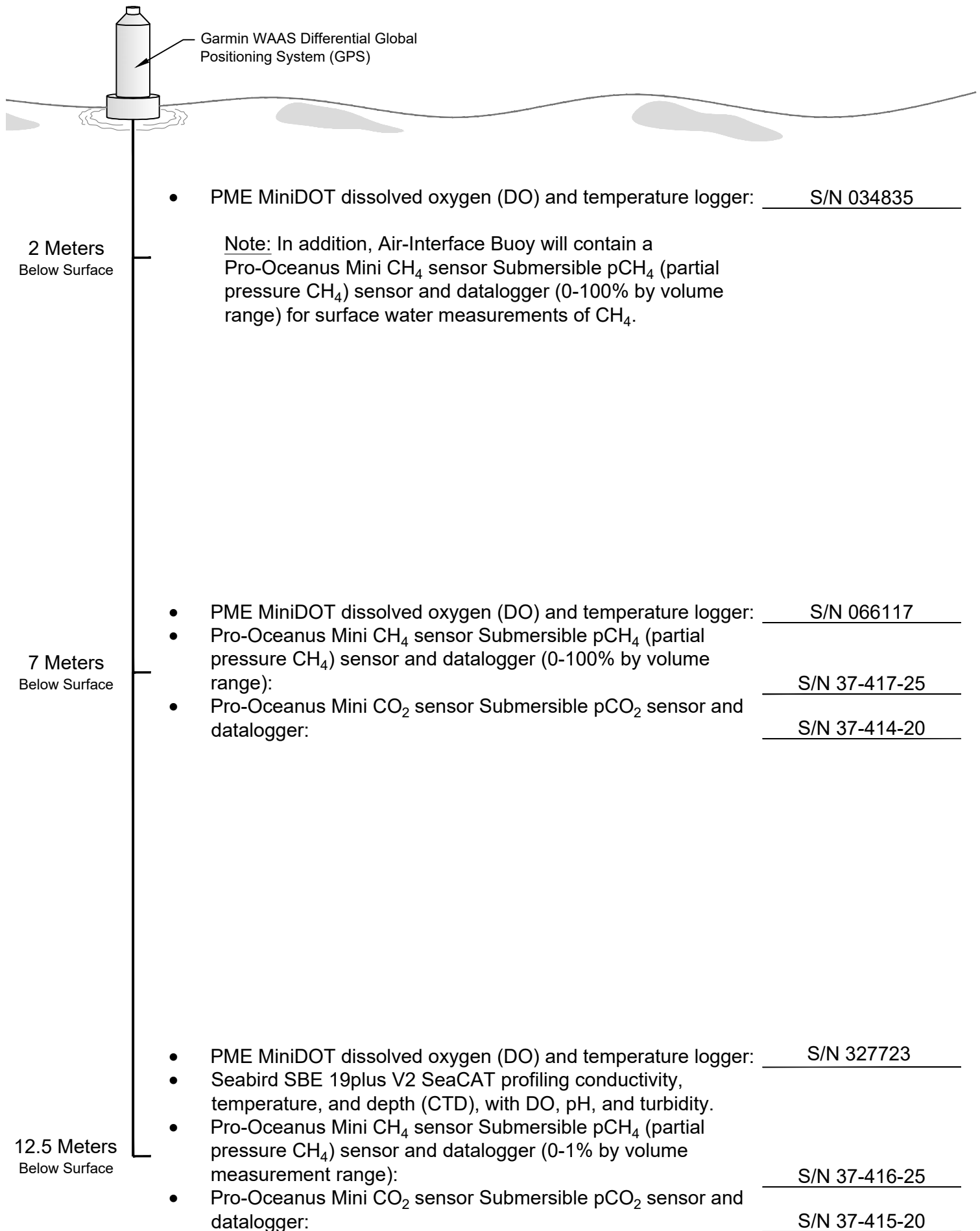
Analytical Data Flags:

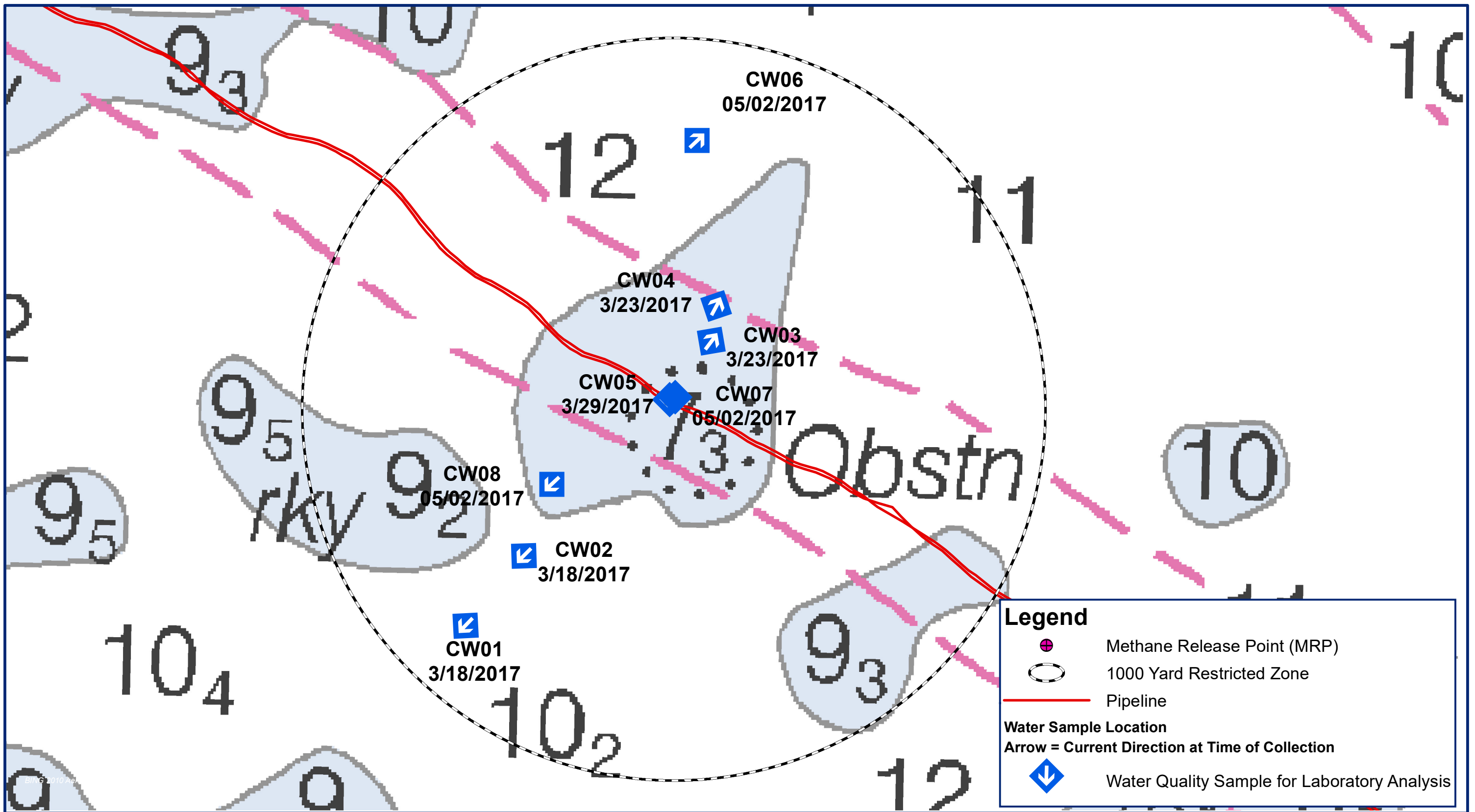
ND Nondetect, method reporting limit (MRL) in brackets
M (H,L,or N) Analyte result is considered an estimated value biased (high, low, uncertain)

Event Number	Drift Name	Barometric Pressure (millibar) ¹	Water Temperature (°C) ²	Salinity (PSU) ²	Water Density (kg/m ³)	Mid Instrument Depth (m)	Deep Instrument Depth (m)	Mid Hydrostatic Pressure (millibar)	Deep Hydrostatic Pressure (millibar)	Mid - MiniCH4				Mid - MiniCO2				Deep - MiniCH4				Deep - MiniCO2			
										Maximum TDG Pressure (millibar)	Saturation at Depth	Distance Downcurrent of MRP (m)	Time Elapsed in Drift (hr:min:sec)	Maximum TDG Pressure (millibar)	Saturation at Depth	Distance Downcurrent of MRP (m)	Time Elapsed in Drift (hr:min:sec)	Maximum TDG Pressure (millibar)	Saturation at Depth	Distance Downcurrent of MRP (m)	Time Elapsed in Drift (hr:min:sec)	Maximum TDG Pressure (millibar)	Saturation at Depth	Distance Downcurrent of MRP (m)	Time Elapsed in Drift (hr:min:sec)
Event 1	D01-031817	1006	-1.42	26.4	1021	7.0	12.5	701	1252	1085	63.6%	250	0:03:30	1708	100.1%	117	0:27:35	1136	50.3%	240	0:03:20	no sensor data			
	D01-031917	1010	-1.50	22.5	1018	7.0	12.5	699	1248	1052	61.6%	-165	0:02:55	1312	76.7%	-47	0:05:00	1158	51.3%	-91	0:04:05	1099	48.7%	295	0:08:50
	D02-031917	1010	-1.51	27.6	1022	7.0	12.5	702	1253	1048	61.3%	-503	0:03:05	1222	71.4%	-480	0:03:30	1170	51.7%	-466	0:04:10	1147	50.7%	-463	0:04:15
	D03-031917	1010	-1.50	22.6	1018	7.0	12.5	699	1248	996	58.3%	-355	0:00:15	1546	90.4%	254	0:18:00	1104	48.9%	-352	0:00:25	1236	54.7%	-272	0:06:00
Event 2	D01-032317	1010	-1.43	27.0	1021	7.0	12.5	701	1252	1182	69.1%	513	0:05:20	1616	94.4%	1859	0:09:35	1176	52.0%	322	0:03:20	1105	48.9%	156	0:01:40
	D02-032317	1010	-1.46	27.1	1021	7.0	12.5	701	1253	1033	60.4%	953	0:16:15	1267	74.0%	1121	0:18:15	1503	66.4%	5194	0:11:05	1803	79.7%	1673	0:25:10
	D03-032317	1010	-1.41	27.5	1022	7.0	12.5	702	1253	1256	73.4%	-462	0:05:15	1766	103.2%	189	0:53:50	1168	51.6%	-436	0:09:40	1384	61.2%	-466	0:07:35
	D04-032317	1010	-1.42	27.5	1022	7.0	12.5	702	1253	1304	76.2%	412	0:13:15	1487	86.9%	792	0:20:00	1371	60.6%	278	0:10:30	1864	82.4%	1583	0:31:30
Event 3	D01-032917	1006	-1.44	27.7	1022	7.0	12.5	702	1253	1046	61.2%	-414	0:00:00	1161	68.0%	603	0:00:06	1203	53.2%	271	0:03:56	1033	45.7%	311	0:00:44
	D02-032917	1006	-1.31	27.8	1022	7.0	12.5	702	1253	1005	58.8%	-827	0:00:00	1100	64.4%	-818	0:00:04	1069	47.3%	-827	0:00:00	1080	47.8%	-846	0:00:00
Event 4	D01-040517	987	-0.99	28.4	1022	5.8	11.3	582	1133	961	61.3%	-185	0:01:28	1085	69.2%	-184	0:00:20	1026	48.4%	-184	0:00:08	1013	47.8%	-184	0:00:00
	D02-040517	987	-0.99	28.5	1022	5.8	11.3	582	1133	1220	77.7%	-128	0:05:08	1532	97.7%	-27	0:17:48	1013	47.8%	-199	0:00:32	1002	47.3%	-201	0:00:24
Event 5	D01-041217	1029	-0.30	27.9	1022	6.5	12.0	652	1203	1054	62.7%	-1370	0:00:24	1267	75.4%	-250	0:07:48	1073	48.1%	-1423	0:00:00	1083	48.5%	-1418	0:00:04
	D02-041217	1029	-0.27	26.8	1021	6.5	12.0	651	1202	990	58.9%	-1090	0:00:12	1158	68.9%	-1118	0:00:00	1079	48.3%	-1118	0:00:00	1085	48.6%	-1118	0:00:00
Event 6	D01-041917	1015	0.77	27.9	1022	6.5	12.0	652	1203	978	58.7%	-1383	0:00:12	1055	63.3%	-1394	0:04:04	1047	47.2%	-1389	0:00:08	1039	46.9%	-1339	0:00:08
	D02-041917	1015	0.97	28.3	1022	6.5	12.0	652	1203	982	58.9%	-840	0:00:16	1060	63.6%	-840	0:00:00	1064	48.0%	-840	0:00:04	1083	48.8%	-840	0:00:00
Event 7	D01-042517	1001	0.97	27.5	1022	6.0	11.5	601	1153	1036	64.6%	-1663	0:00:20	1070	66.7%	-1692	0:00:08	1033	48.0%	-1644	0:00:28	1016	47.2%	-1663	0:00:20
	D03-042517	1001	1.29	26.9	1021	6.0	11.5	601	1152	990	61.8%	-685	0:00:16	1072	66.9%	-710	0:00:00	1034	48.0%	-645	0:00:40	1023	47.5%	-658	0:00:32
Event 8	D03-050217	989	2.23	28.9	1023	6.0	11.5	602	1154	1003	63.0%	-542	0:01:20	1046	65.8%	-548	0:01:04	1035	48.3%	-541	0:01:24	1022	47.7%	1221	0:30:08

1 - Barometric pressure reflects the daily maximum pressure reported onwww.wunderground.com for Nikiski, AK.
2 - Average for entire drift from Seabird SBE 17

FIGURE 1: WATER QUALITY MONITORING BUOY SCHEMATIC
(MARCH 23, 29, APRIL 5, 12, 19, 25, and May 2, 2017)





Base map referenced from National Oceanic and Atmospheric Administration (NOAA), Chart 16663, Alaska - South Coast, Cook Inlet, East Foreland to Anchorage (Scale 1:100,000).

Soundings in Fathoms (Fathoms and Feet to Eleven Fathoms at Mean Lower Low Water)

1 Fathom = 6 Feet = 1.8 Meters

0 200 400 600 800 1,000

Meters



THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.



Project	HILCORP ALASKA, LLC METHANE PIPELINE LEAK COOK INLET, ALASKA		
Drawing	Water Quality Monitoring, Water Sample Locations for Laboratory Analysis (Weeks 1-8)		
Drawing Date	April 2017	Scale	1:9,116.37
File Name	Figure A3 Methane Release_WQ Samples.mxd	Project No.	105.00874.17015
Fig. No.	A-3		

Figure A-11.1a: Buoy Drift #2, May 2, 2017
Dissolved Oxygen Measurements at 1, 6, 11 and 11.5 Meters Depth
Ebb Tide

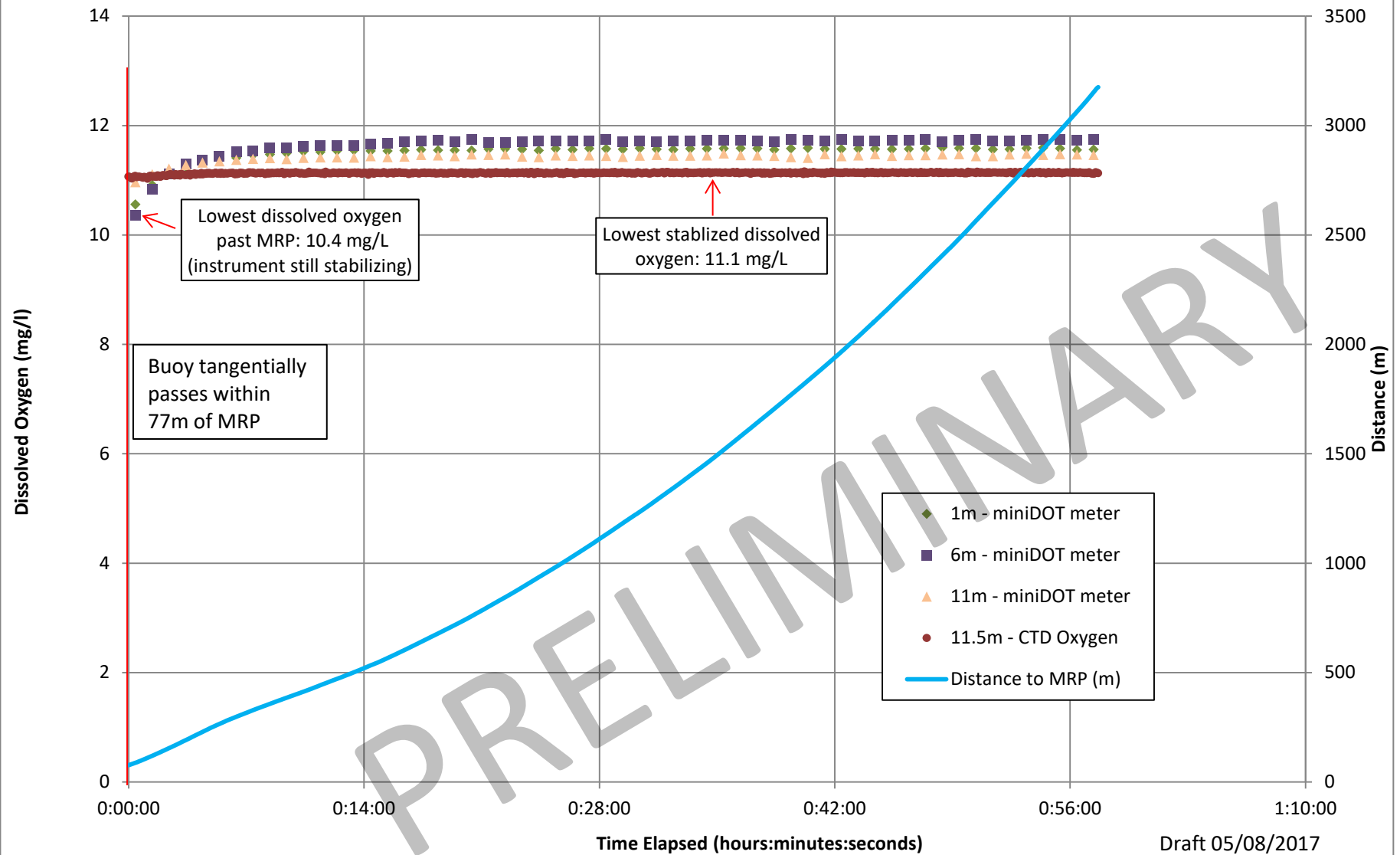


Figure A-11.1b: Buoy Drift #2, May 2, 2017
Dissolved Methane Measurements at 6 and 11.5 Meters Depth
Ebb Tide

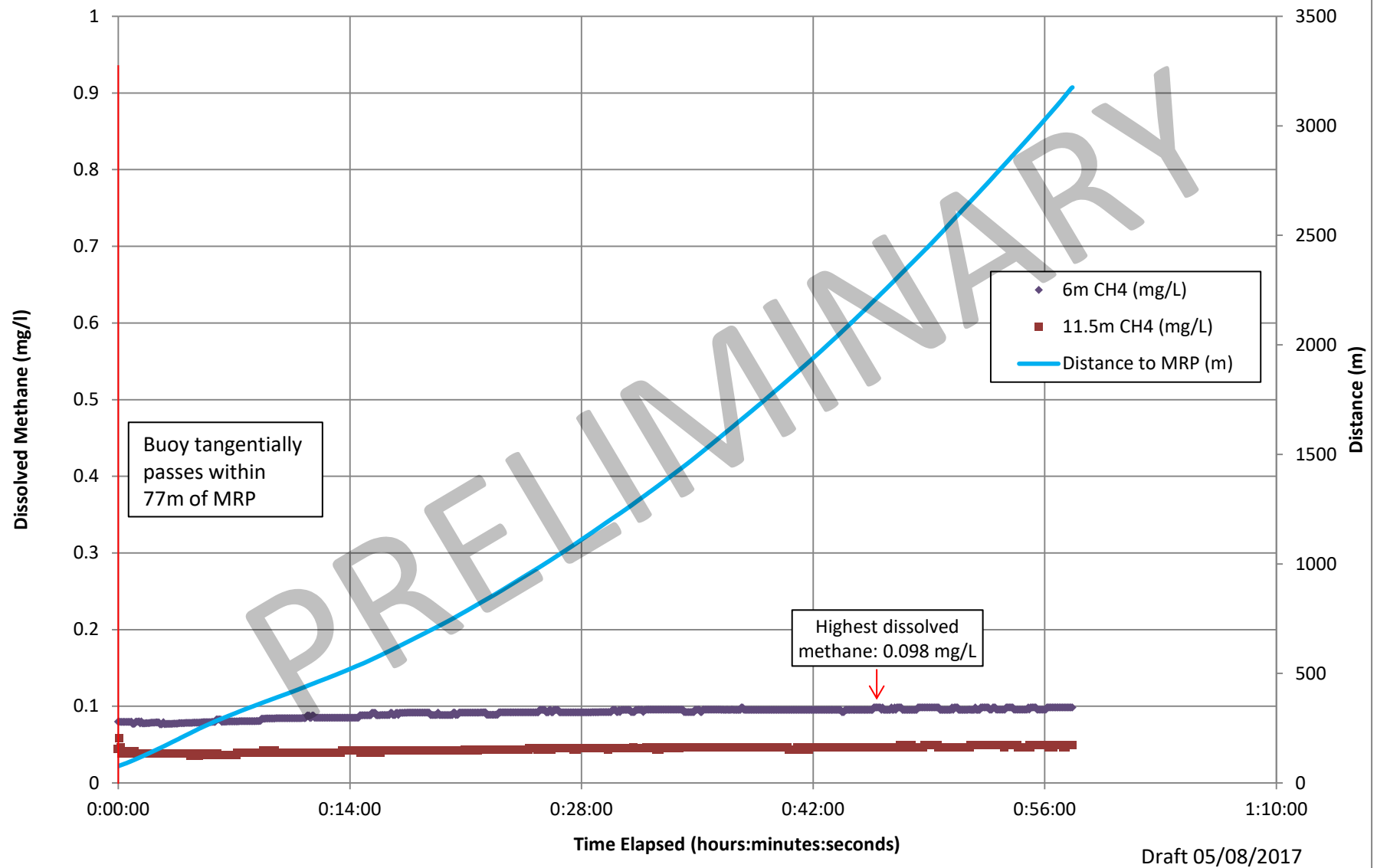
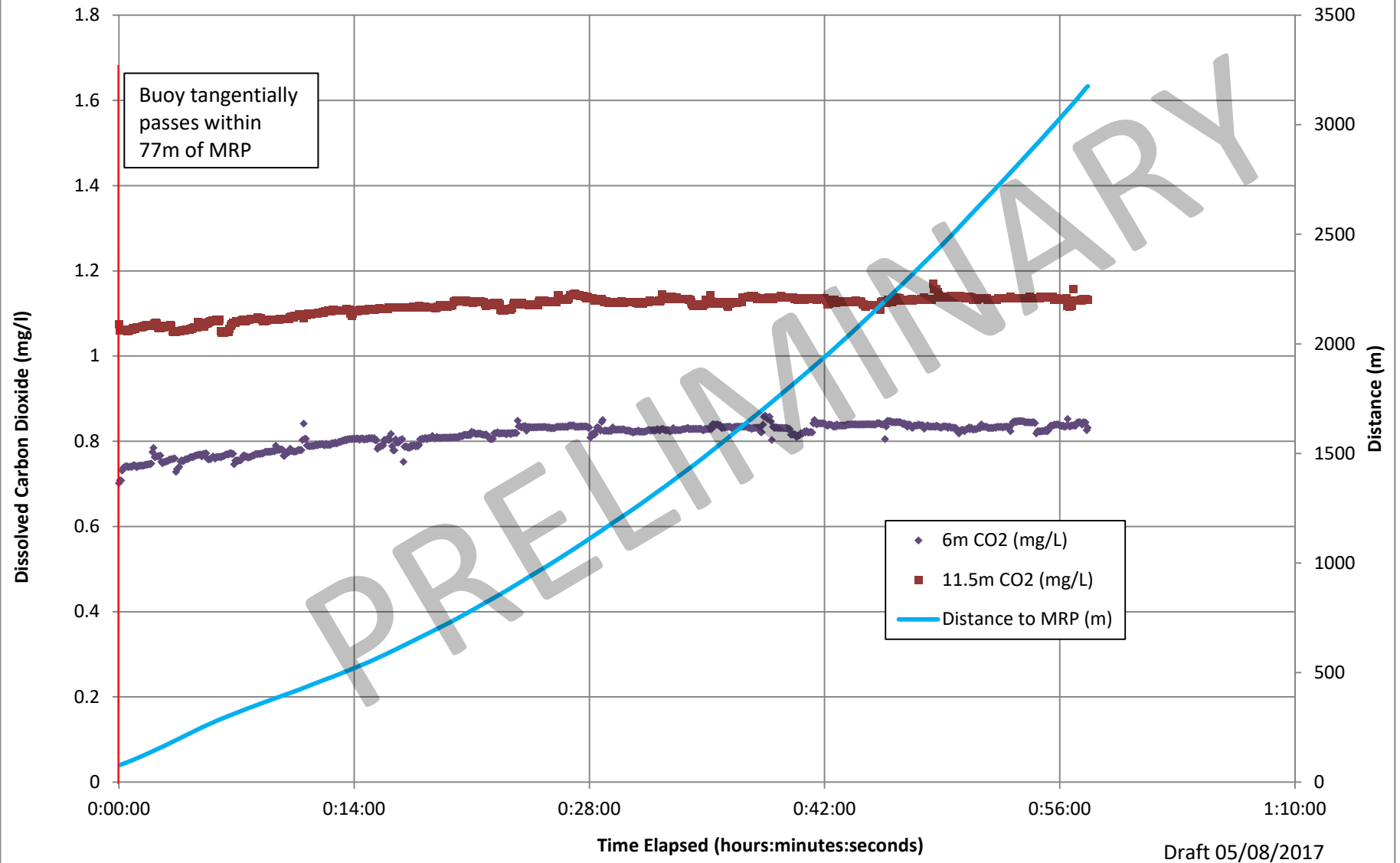
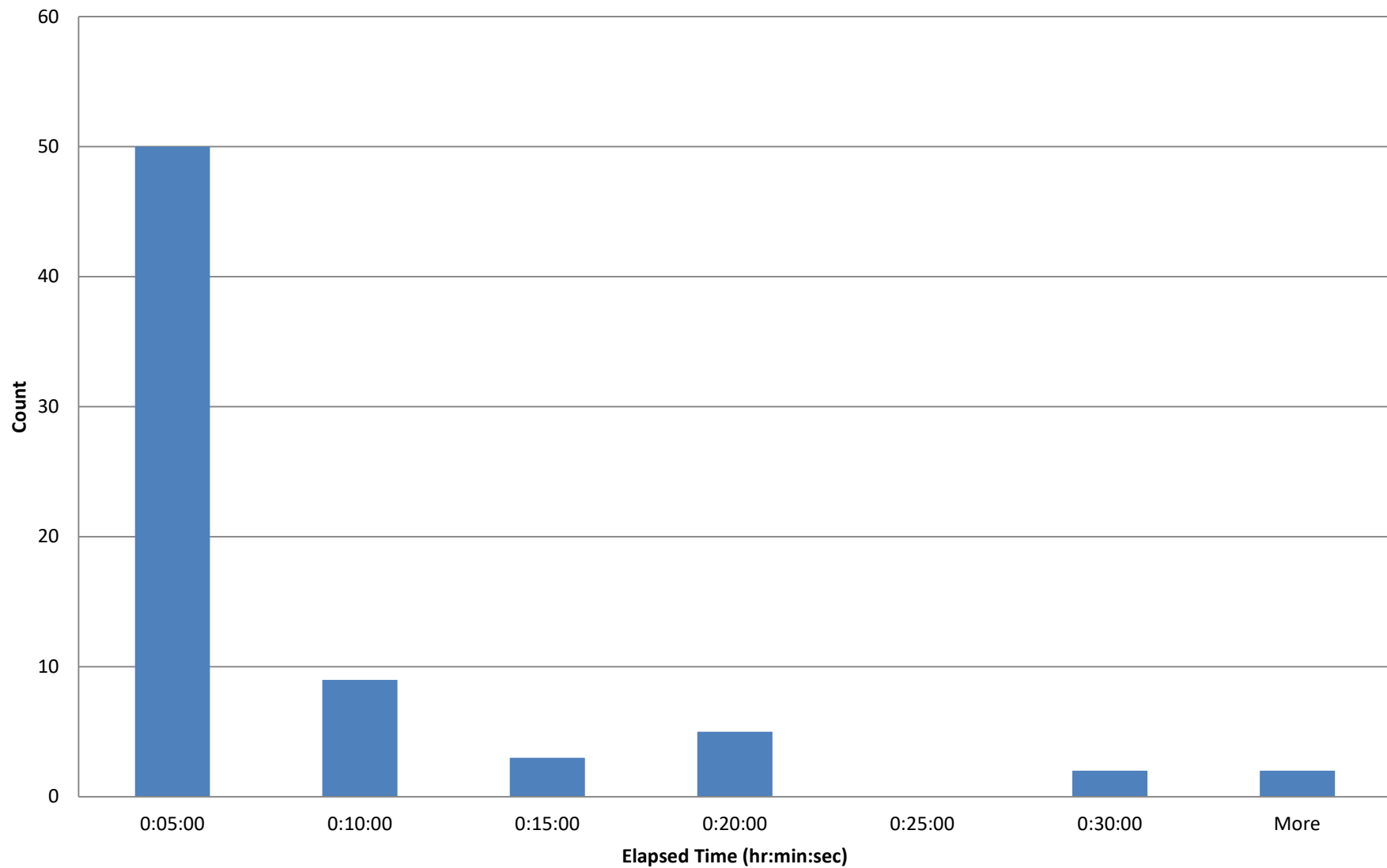


Figure A-11.1c: Buoy Drift #2, May 2, 2017
Dissolved Carbon Dioxide Measurements at 6 and 11.5 Meters Depth
Rbb Tide



**Figure A-12: Histogram of Elapsed Time During Buoy Drift
When Maximum TDG Saturation Occurred**



ATTACHMENT B:

Figure B1: Schematic of Air/Water Interface Buoy

Figure B2: Air / Water Interface Sampling Events, Buoy Tracks March 24 - 26, 2017

Figure B3: Air / Water Interface Sampling Events, Buoy Tracks March 29, 2017

Figure B4: Air / Water Interface Sampling Events, Buoy Tracks April 12, 2017

Figure B5: Air / Water Interface Sampling Events, Buoy Tracks May 2, 2017

Table B1: Summary of Air / Water Interface Buoy Drifts March 24-26, 2017

Table B2: Validated Buoy Drift 1 March 24, 2017 Measurements

Table B3: Validated Buoy Drift 2 March 24, 2017 Measurements

Table B4: Validated Buoy Drift 3 March 24, 2017 Measurements

Table B5: Validated Buoy Drift 4 March 24, 2017 Measurements

Table B6: Validated Buoy Drift 5 March 24, 2017 Measurements

Table B7: Validated Buoy Drift 1 March 26, 2017 Measurements

Table B8: Summary of Air / Water Interface Buoy Drifts March 29, 2017

Table B9: Validated Buoy Drift 1 March 29, 2017 Measurements

Table B10: Validated Buoy Drift 2 March 29, 2017 Measurements

Table B11: Validated Buoy Drift 3 March 29, 2017 Measurements

Table B12: Validated Buoy Drift 4 March 29, 2017 Measurements

Table B13: Validated Buoy Drift 5 March 29, 2017 Measurements

Table B14: Summary of Air / Water Interface Buoy Drifts April 12, 2017

Table B15: Validated Buoy Drift 1 April 12, 2017 Measurements

Table B16: Validated Buoy Drift 2 April 12, 2017 Measurements

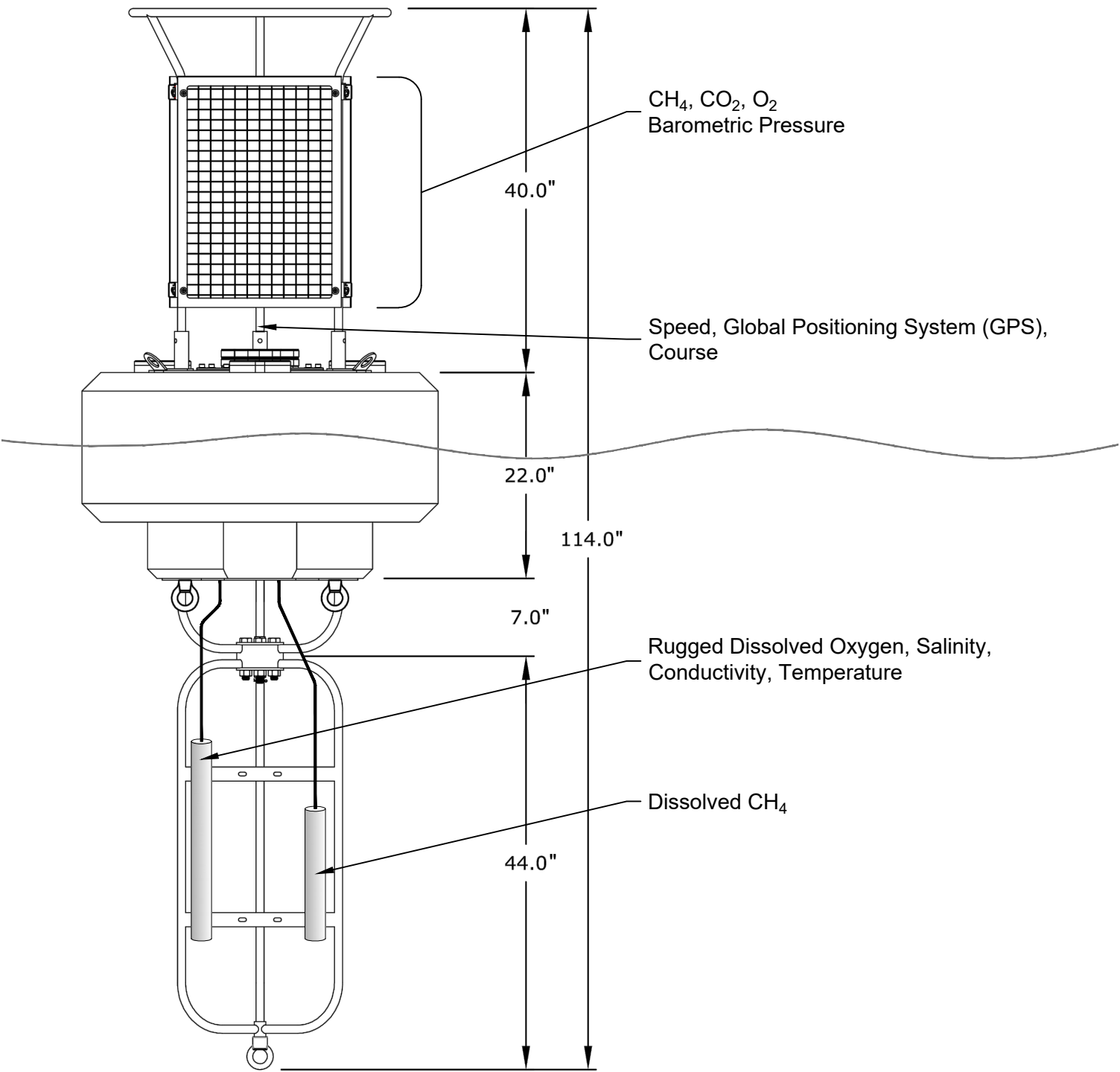
Table B17: Validated Buoy Drift 3 April 12, 2017 Measurements

Table B18: Validated Buoy Drift 4 April 12, 2017 Measurements










Table B19: Summary of Air / Water Interface Buoy Drifts May 2, 2017

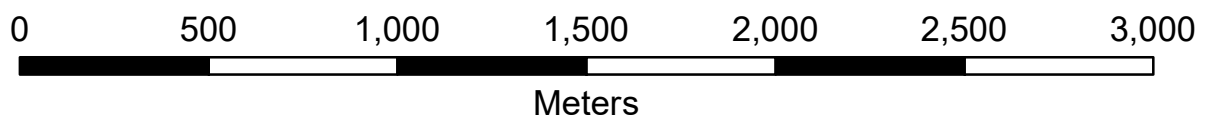
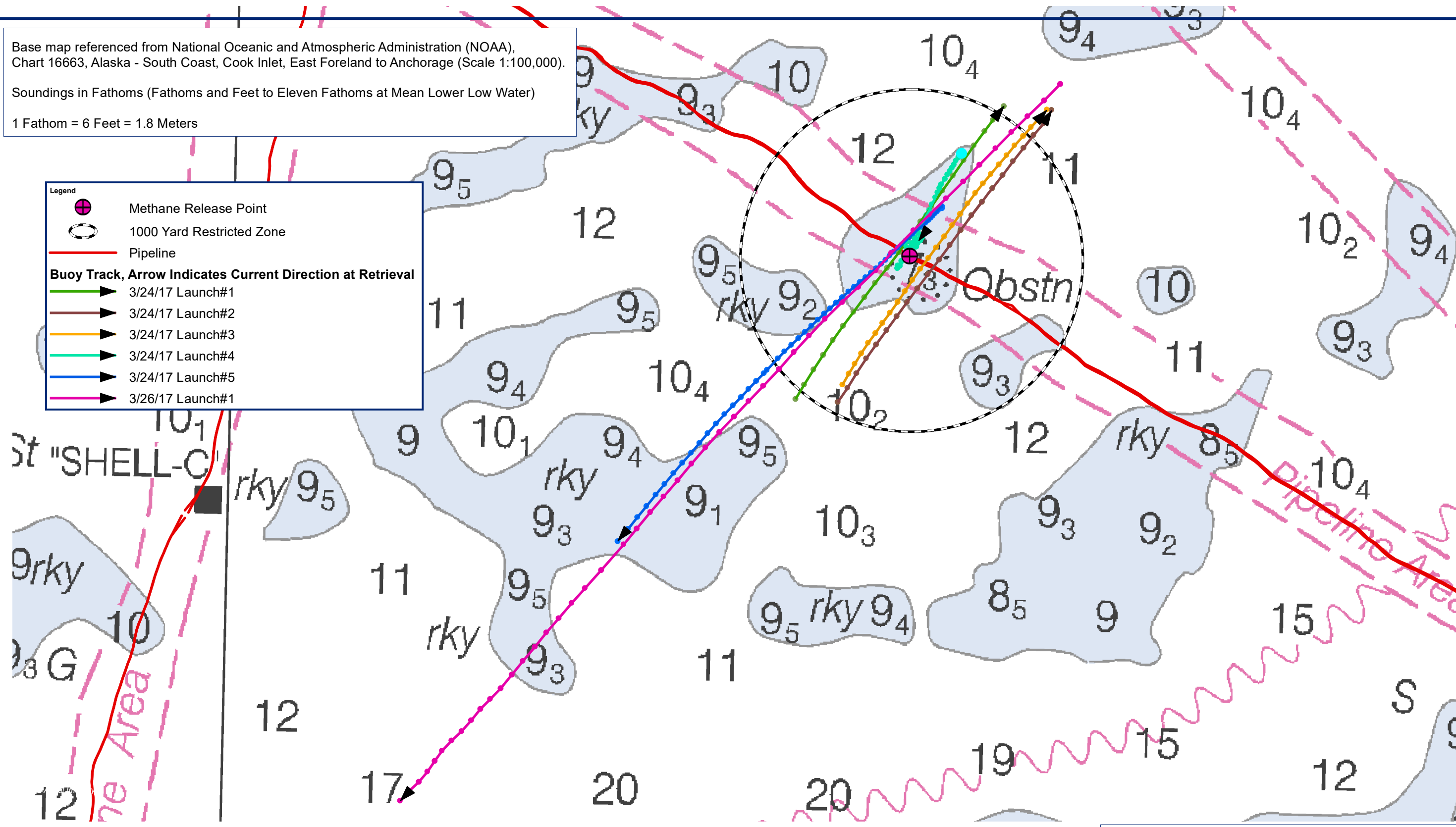
Table B20: Preliminary Buoy Drift 1 May 2, 2017 Measurements

FIGURE B1: AIR / WATER INTERFACE BUOY SCHEMATIC



Base map referenced from National Oceanic and Atmospheric Administration (NOAA), Chart 16663, Alaska - South Coast, Cook Inlet, East Foreland to Anchorage (Scale 1:100,000).
Soundings in Fathoms (Fathoms and Feet to Eleven Fathoms at Mean Lower Low Water)
1 Fathom = 6 Feet = 1.8 Meters

Legend
 Methane Release Point
 1000 Yard Restricted Zone
 Pipeline
Buoy Track, Arrow Indicates Current Direction at Retrieval
 3/24/17 Launch#1
 3/24/17 Launch#2
 3/24/17 Launch#3
 3/24/17 Launch#4
 3/24/17 Launch#5
 3/26/17 Launch#1



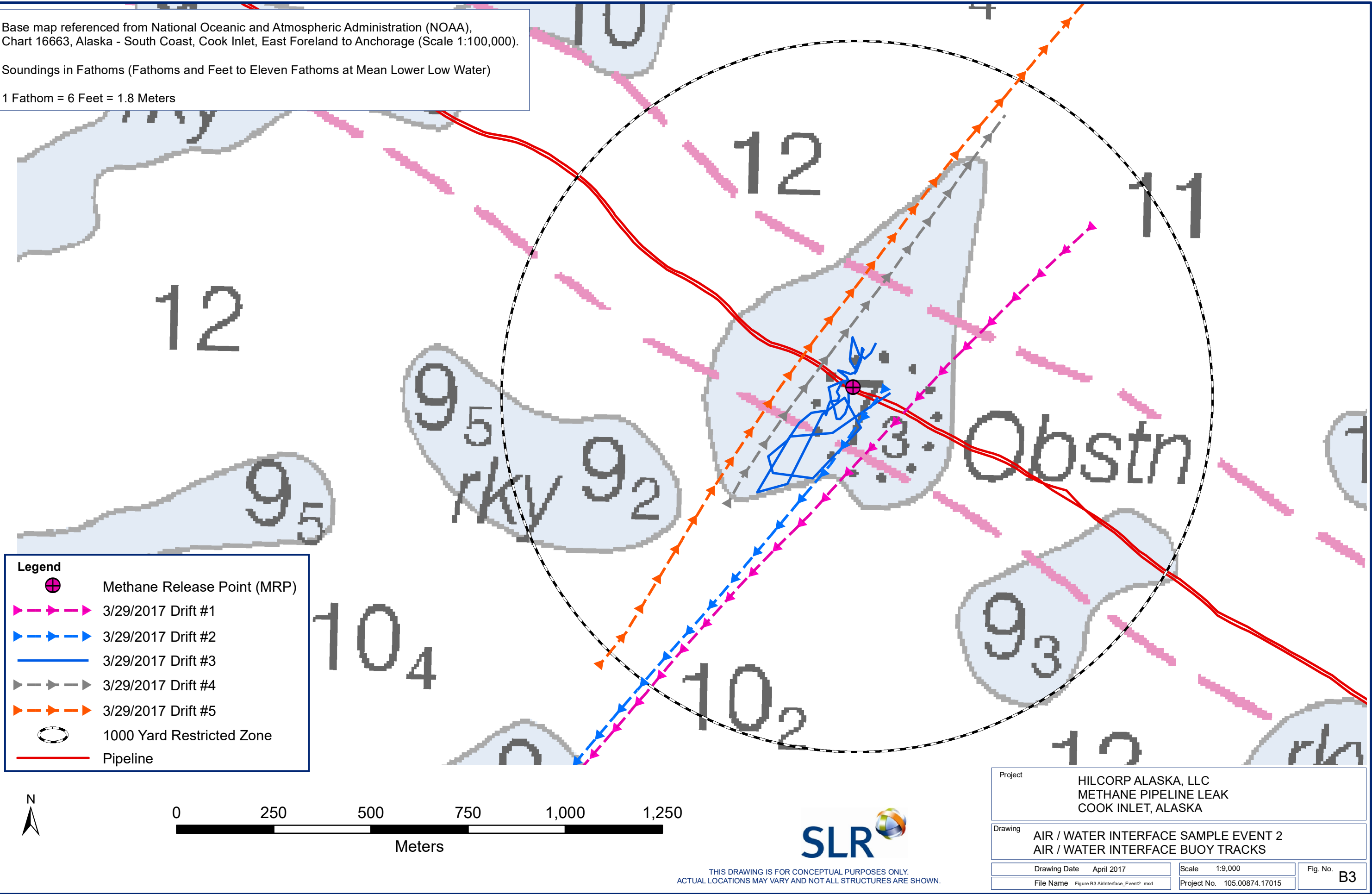
THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Site HILCORP ALASKA, LLC METHANE PIPELINE LEAK COOK INLET, ALASKA			
Drawing Air / Water Interface Sample Event 1 Air / Water Interface Buoy Tracks			
Drawing April 2017	Scale 1:20,000	Fig. No. B2	
File Name Figure B2 AirInterface_Event1.mxd		Project No. 105.00874.17015	

Base map referenced from National Oceanic and Atmospheric Administration (NOAA),
Chart 16663, Alaska - South Coast, Cook Inlet, East Foreland to Anchorage (Scale 1:100,000).

Soundings in Fathoms (Fathoms and Feet to Eleven Fathoms at Mean Lower Low Water)

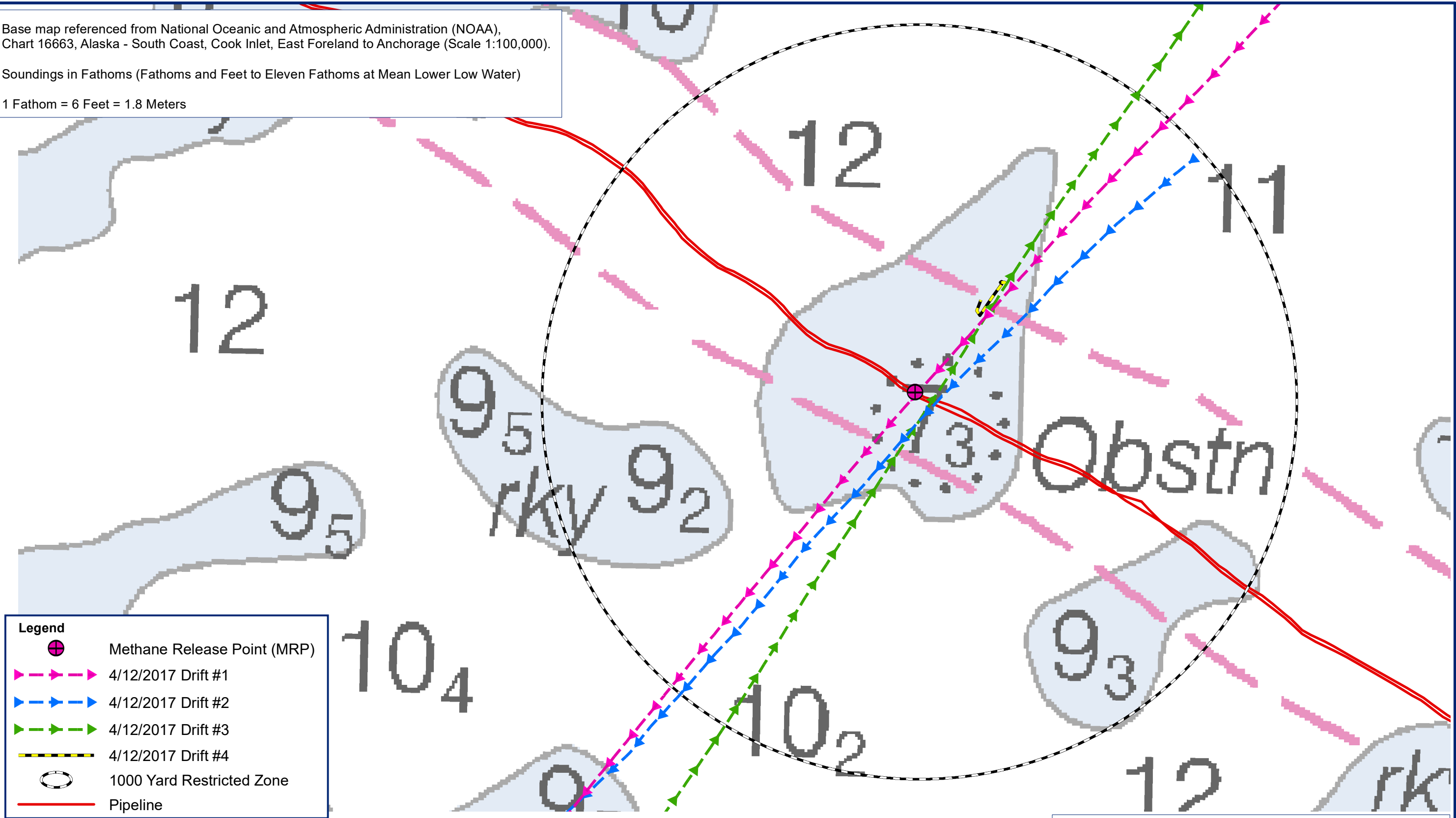
1 Fathom = 6 Feet = 1.8 Meters



Base map referenced from National Oceanic and Atmospheric Administration (NOAA),
Chart 16663, Alaska - South Coast, Cook Inlet, East Foreland to Anchorage (Scale 1:100,000).

Soundings in Fathoms (Fathoms and Feet to Eleven Fathoms at Mean Lower Low Water)

1 Fathom = 6 Feet = 1.8 Meters



Legend

- Methane Release Point (MRP)
- 4/12/2017 Drift #1
- 4/12/2017 Drift #2
- 4/12/2017 Drift #3
- 4/12/2017 Drift #4
- 1000 Yard Restricted Zone
- Pipeline

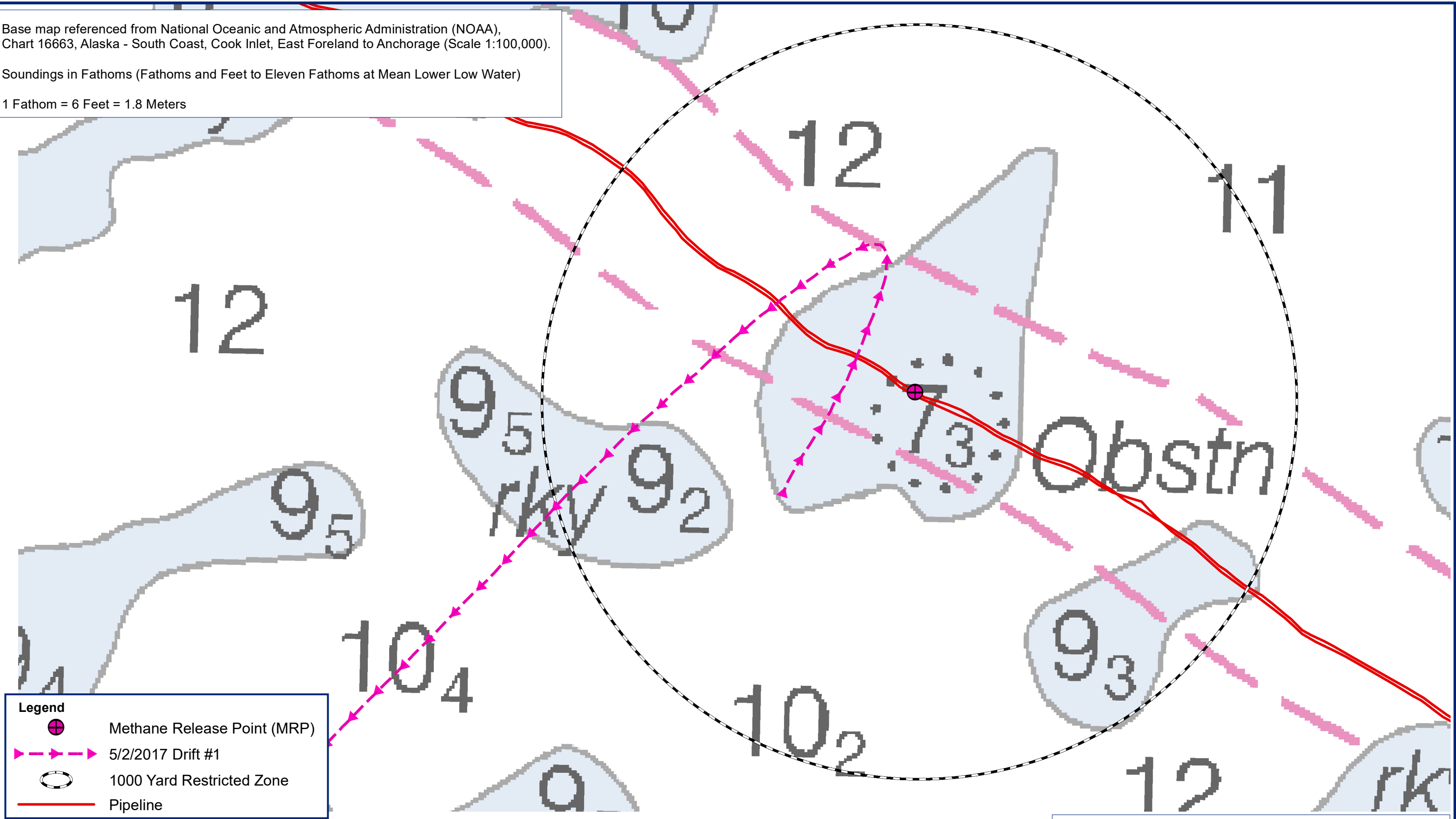
Project	HILCORP ALASKA, LLC METHANE PIPELINE LEAK COOK INLET, ALASKA		
Drawing	AIR / WATER SAMPLING EVENTS BUOY TRACKS APRIL 12, 2017		
Drawing Date	April 2017	Scale	1:9,000
File Name	Figure B4 AirInterface_Event3.mxd	Project No.	105.00874.17015
			Fig. No. B4

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Base map referenced from National Oceanic and Atmospheric Administration (NOAA),
Chart 16663, Alaska - South Coast, Cook Inlet, East Foreland to Anchorage (Scale 1:100,000).

Soundings in Fathoms (Fathoms and Feet to Eleven Fathoms at Mean Lower Low Water)

1 Fathom = 6 Feet = 1.8 Meters



Project	HILCORP ALASKA, LLC METHANE PIPELINE LEAK COOK INLET, ALASKA		
Drawing	AIR / WATER SAMPLING EVENTS BUOY TRACKS MAY 2, 2017		
Drawing Date	May 2017	Scale	1:9,000
File Name	Figure B5 AirInterface_Event4.mxd	Project No.	105.00874.17015
			Fig. No. B5

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Table B1: Summary for Air / Water Interface Buoy Drifts

Buoy Type	Drift Name	General Tide Description	Date	Release Time	Release Location	Retrieval Time	Retrieval Location	Drift Duration	Minimum Distance to MRP (m)	Wind (Knots/direction)	Wave Height (m)
Air / Water	D01-032417	Flood	3/24/2017	13:21	60 46.176 N 151 26.504 W	13:41	60 47.032 N 151 25.496 W	0:20	61	calm	0
Air / Water	D02-032417	Flood	3/24/2017	14:05	60 46.169 N 151 26.435 W	14:26	60 47.23 N 151 25.214 W	0:21	138	calm	0
Air / Water	D03-032417	Flood	3/24/2017	14:48	60 46.22 N 151 26.41 W	15:15	60 47.024 N 151 25.243 W	0:27	89	calm	0
Air / Water	D04-032417	End of flood/Slack	3/24/2017	15:30	60 46.64 N 151 25.971 W	16:22	60 46.893 N 151 25.738 W	0:52	15	calm	0
Air / Water	D05-032417	Slack/Start of Ebb	3/24/2017	16:50	60 46.734 N 151 25.848 W	17:47	60 45.756 N 151 27.71 W	0:57	74	calm	0
Air / Water	D01-032617	Ebb	3/26/2017	10:35	60 47.099 N 151 25.169 W	11:24	60 44.995 N 151 28.954 W	0:49	100	5, SSW	0

Table B2: Validated Buoy Drift 1 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events														
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)	
Launch 1: Friday, 3/24/2017														
3/24/2017 13:21	60.769603, -151.444732	-0.96	12.34	41404	24.45	<0.1	<10,000	<0.1%	20.910	<2%	30.98	5.98	975.2	
3/24/2017 13:22	60.770301, -151.443923	-1.06	12.32	41655	24.58	<0.1	<10,000	<0.1%	20.910	<2%	31.33	5.33	886.9	
3/24/2017 13:23	60.771038, -151.443038	-1.24	12.38	41932	24.72	<0.1	<10,000	<0.1%	20.910	<2%	32.77	5.42	792.9	
3/24/2017 13:24	60.771747, -151.442138	-1.25	12.36	41916	24.70	<0.1	<10,000	<0.1%	20.910	<2%	33.22	5.72	701.0	
3/24/2017 13:25	60.772468, -151.441192	-1.27	12.35	41977	24.74	<0.1	<10,000	<0.1%	20.910	<2%	34.17	6.00	606.6	
3/24/2017 13:26	60.773155, -151.440216	-1.28	12.36	41991	24.74	<0.1	<10,000	<0.1%	20.880	<2%	33.54	5.74	514.3	
3/24/2017 13:27	60.773845, -151.439239	-1.3	12.35	42020	24.76	<0.1	<10,000	<0.1%	20.910	<2%	34.04	5.96	422.1	
3/24/2017 13:28	60.774551, -151.438217	-1.31	12.35	42072	24.79	<0.1	<10,000	<0.1%	20.910	<2%	36.19	6.05	327.3	
3/24/2017 13:29	60.775253, -151.437179	-1.34	12.36	42118	24.81	<0.1	<10,000	<0.1%	20.880	<2%	37.67	6.07	233.4	
3/24/2017 13:30	60.775989, -151.436035	-1.33	12.36	42123	24.82	<0.1	<10,000	<0.1%	20.941	<2%	37.02	6.31	135.8	
3/24/2017 13:31	60.776744, -151.434921	-1.33	12.35	42099	24.80	<0.1	<10,000	<0.1%	20.910	<2%	34.27	6.57	61.3	
3/24/2017 13:32	60.777519, -151.433837	-1.36	NR	42112	24.80	<0.1	<10,000	<0.1%	20.880	<2%	33.11	6.05	104.7	
3/24/2017 13:33	60.778244, -151.432861	-1.37	12.36	42114	24.80	<0.1	<10,000	<0.1%	20.941	<2%	35.78	5.88	192.8	
3/24/2017 13:34	60.77898, -151.431808	-1.37	12.36	42115	24.80	<0.1	<10,000	<0.1%	20.910	<2%	34.83	6.13	289.1	
3/24/2017 13:35	60.779731, -151.430786	-1.39	12.37	42138	24.81	<0.1	<10,000	<0.1%	20.880	<2%	NR	NR	388.0	
3/24/2017 13:36	60.780475, -151.429779	-1.37	12.37	42082	24.78	<0.1	<10,000	<0.1%	20.910	<2%	34.47	6.03	486.3	
3/24/2017 13:37	60.781211, -151.428787	-1.39	12.37	42100	24.79	<0.1	<10,000	<0.1%	20.910	<2%	33.76	5.96	583.8	
3/24/2017 13:38	60.781936, -151.427795	-1.38	12.37	42086	24.78	<0.1	<10,000	<0.1%	20.910	<2%	34.26	5.85	680.3	
3/24/2017 13:39	60.782634, -151.426788	-1.4	12.35	42464	25.02	<0.1	<10,000	<0.1%	20.910	<2%	35.67	5.75	774.8	
3/24/2017 13:40	60.783195, -151.425979	-1.4	12.31	43176	25.48	<0.1	<10,000	<0.1%	20.910	<2%	38.58	5.33	850.7	
3/24/2017 13:41	60.783863, -151.424942	-1.4	12.32	42993	25.36	<0.1	<10,000	<0.1%	20.910	<2%	36.15	5.31	943.3	

NR – Instrument did not record a reading at this time interval

Table B3: Validated Buoy Drift 2 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 2: Friday, 3/24/2017													
3/24/2017 14:05	60.769489, -151.440582	-1	12.32	43328	25.68	<0.1	<10,000	<0.1%	20.910	<2%	34.16	6.61	869.0
3/24/2017 14:06	60.770187, -151.439666	-1.1	12.34	43639	25.85	<0.1	<10,000	<0.1%	20.910	<2%	33.31	5.79	777.8
3/24/2017 14:07	60.770896, -151.438827	-1.2	12.28	44621	26.46	<0.1	<10,000	<0.1%	20.910	<2%	30.40	5.59	687.3
3/24/2017 14:08	60.771625, -151.437896	-1.22	12.29	43810	25.93	<0.1	<10,000	<0.1%	20.910	<2%	36.08	5.55	593.1
3/24/2017 14:09	60.772308, -151.43695	-1.25	12.26	44151	26.14	<0.1	<10,000	<0.1%	20.910	<2%	34.69	5.63	503.9
3/24/2017 14:10	60.773002, -151.435974	-1.28	12.34	42874	25.31	<0.1	<10,000	<0.1%	20.910	<2%	34.58	5.63	414.1
3/24/2017 14:11	60.773681, -151.434997	-1.33	12.29	43963	26.00	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	328.2
3/24/2017 14:12	60.774368, -151.434005	-1.33	12.28	43995	26.02	<0.1	<10,000	<0.1%	20.910	<2%	36.70	5.64	245.9
3/24/2017 14:13	60.775035, -151.433029	-1.36	12.28	44009	26.03	<0.1	<10,000	<0.1%	20.910	<2%	36.33	5.68	177.2
3/24/2017 14:14	60.775726, -151.432006	-1.34	12.27	44007	26.03	<0.1	<10,000	<0.1%	20.910	<2%	36.11	5.72	137.6
3/24/2017 14:15	60.776435, -151.430953	-1.33	12.27	44002	26.03	<0.1	<10,000	<0.1%	20.910	<2%	34.85	5.81	157.8
3/24/2017 14:16	60.777153, -151.429946	-1.34	12.27	43983	26.01	<0.1	<10,000	<0.1%	20.910	<2%	34.52	5.96	221.1
3/24/2017 14:17	60.777877, -151.428924	-1.36	12.28	44059	26.06	<0.1	<10,000	<0.1%	20.910	<2%	36.35	5.85	303.7
3/24/2017 14:18	60.778591, -151.427886	-1.35	12.27	44021	26.03	<0.1	<10,000	<0.1%	20.910	<2%	36.16	5.77	393.4
3/24/2017 14:19	60.779254, -151.426895	-1.36	12.26	44036	26.04	<0.1	<10,000	<0.1%	20.910	<2%	37.09	5.48	480.5
3/24/2017 14:20	60.779907, -151.425903	-1.36	12.27	44042	26.04	<0.1	<10,000	<0.1%	20.910	<2%	36.50	5.44	568.3
3/24/2017 14:21	60.780551, -151.424911	-1.37	12.27	44034	26.04	<0.1	<10,000	<0.1%	20.910	<2%	36.57	5.50	656.1
3/24/2017 14:22	60.78123, -151.423934	-1.37	12.27	44050	26.05	<0.1	<10,000	<0.1%	20.910	<2%	37.04	5.59	746.4
3/24/2017 14:23	60.781875, -151.422943	-1.39	12.27	44042	26.04	<0.1	<10,000	<0.1%	20.910	<2%	38.10	5.27	835.0
3/24/2017 14:24	60.782501, -151.421981	-1.39	12.26	44049	26.04	<0.1	<10,000	<0.1%	20.910	<2%	37.87	5.16	921.2
3/24/2017 14:25	60.783084, -151.421005	-1.39	12.28	43998	26.01	<0.1	<10,000	<0.1%	20.910	<2%	40.76	5.16	1004.6
3/24/2017 14:26	60.783718, -151.420242	-1.41	12.27	44322	26.21	<0.1	<10,000	<0.1%	20.910	<2%	25.61	3.90	1084.3

NR – Instrument did not record a reading at this time interval

Table B4: Validated Buoy Drift 3 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 3: Friday, 3/24/2017													
3/24/2017 14:48	60.770336, -151.44017	-0.85	12.18	44435	26.43	<0.1	<10,000	<0.1%	20.910	<2%	35.90	3.03	774.4
3/24/2017 14:49	60.770877, -151.439575	-0.97	12.21	44746	26.61	<0.1	<10,000	<0.1%	20.910	<2%	23.89	4.25	706.2
3/24/2017 14:50	60.771358, -151.438995	-1.09	12.22	44951	26.71	<0.1	<10,000	<0.1%	20.910	<2%	33.67	3.72	644.3
3/24/2017 14:51	60.771854, -151.438385	-1.1	12.21	45041	26.76	<0.1	<10,000	<0.1%	20.910	<2%	33.69	3.83	580.3
3/24/2017 14:52	60.772361, -151.437728	-1.16	12.22	45162	26.82	<0.1	<10,000	<0.1%	20.910	<2%	32.18	3.92	514.1
3/24/2017 14:53	60.772853, -151.437042	-1.21	12.22	45229	26.86	<0.1	<10,000	<0.1%	20.910	<2%	33.08	3.98	449.1
3/24/2017 14:54	60.773342, -151.43637	-1.21	12.21	45260	26.87	Invalid	<10,000	<0.1%	20.910	<2%	35.51	4.01	385.1
3/24/2017 14:55	60.773841, -151.435653	-1.23	12.22	45333	26.92	<0.1	<10,000	<0.1%	20.910	<2%	34.34	4.16	319.8
3/24/2017 14:56	60.774356, -151.434936	-1.26	12.21	45557	27.05	<0.1	<10,000	<0.1%	20.910	<2%	32.57	4.12	254.1
3/24/2017 14:57	60.774883, -151.434234	-1.27	12.20	45601	27.08	<0.1	<10,000	<0.1%	20.910	<2%	32.29	4.24	189.6
3/24/2017 14:58	60.775432, -151.433517	-1.27	12.20	45615	27.09	<0.1	<10,000	<0.1%	20.910	<2%	32.91	4.35	128.6
3/24/2017 14:59	60.775959, -151.4328	-1.29	12.24	45123	26.76	<0.1	<10,000	<0.1%	20.910	<2%	33.13	4.40	89.2
3/24/2017 15:00	60.7765, -151.432022	-1.29	12.29	45136	26.77	<0.1	<10,000	<0.1%	20.910	<2%	34.38	4.42	99.3
3/24/2017 15:01	60.777019, -151.431304	-1.31	12.29	45156	26.78	<0.1	<10,000	<0.1%	20.910	<2%	33.36	4.33	146.4
3/24/2017 15:02	60.777553, -151.430526	-1.31	12.29	45185	26.80	<0.1	<10,000	<0.1%	20.910	<2%	33.91	4.38	210.3
3/24/2017 15:03	60.778095, -151.429763	-1.32	12.31	45216	26.81	<0.1	<10,000	<0.1%	20.910	<2%	34.38	4.37	278.5
3/24/2017 15:04	60.77864, -151.429016	-1.31	12.30	45240	26.83	<0.1	<10,000	<0.1%	20.910	<2%	32.74	4.38	348.3
3/24/2017 15:05	60.779163, -151.428283	-1.33	12.30	45300	26.87	<0.1	<10,000	<0.1%	20.910	<2%	33.44	4.27	416.9
3/24/2017 15:06	60.779663, -151.427566	-1.34	12.30	45337	26.89	<0.1	<10,000	<0.1%	20.910	<2%	35.42	4.05	483.6
3/24/2017 15:07	60.780132, -151.426834	-1.33	12.29	45293	26.86	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	548.7
3/24/2017 15:08	60.78059, -151.426086	-1.35	12.30	45343	26.89	<0.1	<10,000	<0.1%	20.910	<2%	38.05	4.09	613.6
3/24/2017 15:09	60.781051, -151.425308	-1.36	12.28	45352	26.89	<0.1	<10,000	<0.1%	20.910	<2%	39.66	4.11	679.8
3/24/2017 15:10	60.781509, -151.42456	-1.35	12.30	45357	26.90	<0.1	<10,000	<0.1%	20.910	<2%	37.53	4.03	744.8

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B4: Validated Buoy Drift 3 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 15:11	60.781982, -151.423797	-1.35	12.31	45371	26.91	<0.1	<10,000	<0.1%	20.910	<2%	38.50	4.18	811.6
3/24/2017 15:12	60.782447, -151.423004	-1.35	12.30	45387	26.92	<0.1	<10,000	<0.1%	20.880	<2%	40.95	3.92	878.8
3/24/2017 15:13	60.782882, -151.422241	-1.35	12.28	45412	26.93	<0.1	<10,000	<0.1%	20.910	<2%	41.63	3.90	942.5
3/24/2017 15:14	60.783317, -151.421478	-1.36	12.27	45434	26.95	<0.1	<10,000	<0.1%	20.910	<2%	40.58	3.81	1006.1
3/24/2017 15:15	60.783729, -151.420715	-1.36	12.26	45431	26.94	<0.1	<10,000	<0.1%	20.910	<2%	44.48	3.50	1067.9

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B5: Validated Buoy Drift 4 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events														
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)	
Launch 4: Friday, 3/24/2017														
3/24/2017 15:30	60.777332, -151.432846	-0.89	12.24	43797	26.01	<0.1	<10,000	<0.1%	20.910	<2%	104.69	1.51	99.9	
3/24/2017 15:31	60.777484, -151.432678	-1.11	12.19	45194	26.86	<0.1	<10,000	<0.1%	20.910	<2%	44.23	1.03	119.0	
3/24/2017 15:32	60.777545, -151.4328	-1.16	12.18	45294	26.91	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.64	121.6	
3/24/2017 15:33	60.777469, -151.432846	-1.23	12.17	45499	27.02	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.57	113.0	
3/24/2017 15:34	60.777446, -151.432769	-1.26	12.16	45818	27.22	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.72	112.8	
3/24/2017 15:35	60.777557, -151.432662	-1.27	12.16	45758	27.18	<0.1	<10,000	<0.1%	20.910	<2%	44.23	0.70	126.4	
3/24/2017 15:36	60.777488, -151.432785	-1.29	12.16	45794	27.20	<0.1	<10,000	<0.1%	20.910	<2%	44.23	1.07	116.4	
3/24/2017 15:37	60.77732, -151.432907	-1.28	12.15	45871	27.25	Invalid	<10,000	<0.1%	20.910	<2%	NR	NR	97.0	
3/24/2017 15:38	60.777206, -151.433105	-1.3	12.14	45989	27.32	Invalid	<10,000	<0.1%	20.910	<2%	44.23	1.77	80.6	
3/24/2017 15:39	60.776988, -151.4337	-1.31	12.18	46144	27.42	Invalid	<10,000	<0.1%	20.910	<2%	256.34	2.01	46.3	
3/24/2017 15:40	60.776977, -151.434127	-1.32	12.16	46142	27.42	Invalid	<10,000	<0.1%	20.910	<2%	256.34	1.05	47.0	
3/24/2017 15:41	60.77705, -151.434371	-1.3	12.16	46141	27.42	<0.1	<10,000	<0.1%	20.910	<2%	256.34	0.85	59.8	
3/24/2017 15:42	60.777164, -151.434356	-1.3	12.16	46191	27.45	<0.1	<10,000	<0.1%	20.910	<2%	256.34	1.14	70.9	
3/24/2017 15:43	60.777286, -151.434066	-1.31	12.17	46208	27.46	<0.1	<10,000	<0.1%	20.910	<2%	256.34	2.03	79.7	
3/24/2017 15:44	60.777225, -151.433456	-1.28	12.15	46201	27.47	<0.1	<10,000	<0.1%	20.910	<2%	108.51	1.94	75.0	
3/24/2017 15:45	60.777034, -151.433227	-1.32	12.11	46262	27.49	Invalid	<10,000	<0.1%	20.880	<2%	108.51	1.27	60.8	
3/24/2017 15:46	60.776988, -151.433502	-1.29	12.14	46333	27.55	<0.1	<10,000	<0.1%	20.849	<2%	108.51	0.57	49.3	
3/24/2017 15:47	60.776897, -151.433532	-1.33	12.18	45734	27.15	<0.1	<10,000	<0.1%	20.880	<2%	188.21	1.46	39.3	
3/24/2017 15:48	60.776706, -151.433746	-1.32	12.15	46398	27.58	<0.1	<10,000	<0.1%	20.910	<2%	188.21	0.57	15.2	
3/24/2017 15:49	60.776847, -151.43367	-1.29	12.14	46350	27.56	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.31	31.4	
3/24/2017 15:50	60.777019, -151.433502	-1.3	12.12	46378	27.58	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.64	52.5	
3/24/2017 15:51	60.777229, -151.433242	-1.34	12.08	46946	27.93	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.75	79.5	
3/24/2017 15:52	60.777416, -151.432937	-1.34	12.09	46939	27.93	<0.1	<10,000	<0.1%	20.910	<2%	10.71	1.87	105.4	

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

-- Buoy was removed from the water and repositioned.

Table B5: Validated Buoy Drift 4 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 15:53	60.777618, -151.432586	--	--	--	--	--	<10,000	<0.1%	20.910	<2%	35.88	2.20	134.3
3/24/2017 15:54	60.777713, -151.432403	--	--	--	--	--	<10,000	<0.1%	20.910	<2%	37.21	0.75	148.5
3/24/2017 15:55	60.77721, -151.433258	--	--	--	--	--	<10,000	<0.1%	20.818	<2%	217.16	6.27	77.2
3/24/2017 15:56	60.776569, -151.434097	--	--	--	--	--	<10,000	<0.1%	20.880	<2%	214.30	4.40	13.7
3/24/2017 15:57	60.776092, -151.434799	-1.24	12.30	46466	27.65	<0.1	<10,000	<0.1%	20.880	<2%	221.93	2.35	74.9
3/24/2017 15:58	60.775981, -151.435043	-1.24	12.20	46592	27.73	<0.1	<10,000	<0.1%	20.880	<2%	22.22	1.50	92.9
3/24/2017 15:59	60.7761, -151.435012	-1.28	12.18	46615	27.73	<0.1	<10,000	<0.1%	20.910	<2%	356.75	0.88	82.7
3/24/2017 16:00	60.776336, -151.434646	-1.3	12.15	46614	27.73	<0.1	<10,000	<0.1%	20.880	<2%	26.76	2.18	51.2
3/24/2017 16:01	60.776615, -151.43431	-1.3	12.16	46629	27.74	<0.1	<10,000	<0.1%	20.910	<2%	30.40	2.33	25.6
3/24/2017 16:02	60.776901, -151.43399	-1.31	12.14	46646	27.75	<0.1	<10,000	<0.1%	20.910	<2%	28.88	2.18	36.8
3/24/2017 16:03	60.777183, -151.433685	-1.32	12.14	46674	27.76	<0.1	<10,000	<0.1%	20.910	<2%	27.32	2.09	67.9
3/24/2017 16:04	60.777442, -151.433395	-1.32	12.14	46682	27.77	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.07	99.1
3/24/2017 16:05	60.777702, -151.433105	-1.32	12.15	46722	27.79	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.03	131.3
3/24/2017 16:06	60.778034, -151.432785	NR	NR	NR	NR	NR	NR	NR	NR	NR	27.04	1.94	171.8
3/24/2017 16:07	60.778289, -151.432556	-1.33	12.13	46716	27.79	<0.1	<10,000	<0.1%	20.880	<2%	27.04	2.01	202.7
3/24/2017 16:08	60.778545, -151.432296	-1.33	12.13	46730	27.80	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.01	234.4
3/24/2017 16:09	60.778804, -151.432037	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.941	<2%	27.04	2.01	266.3
3/24/2017 16:10	60.779067, -151.431777	-1.32	12.12	46735	27.80	<0.1	<10,000	<0.1%	20.910	<2%	27.04	2.03	298.7
3/24/2017 16:11	60.779418, -151.431472	-1.32	12.11	46759	27.82	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.87	341.1
3/24/2017 16:12	60.779659, -151.431274	-1.33	12.12	46788	27.83	NR	<10,000	<0.1%	20.910	<2%	27.04	1.87	370.0
3/24/2017 16:13	60.779865, -151.431091	NR	NR	NR	NR	<0.1	NR	NR	NR	NR	27.04	1.79	394.9
3/24/2017 16:14	60.780036, -151.430923	-1.21	12.13	46804	27.88	NR	<10,000	<0.1%	20.910	<2%	27.04	1.74	416.0
3/24/2017 16:15	60.780319, -151.430587	-1.22	12.11	46649	27.77	NR	<10,000	<0.1%	20.910	<2%	27.04	1.64	452.1
3/24/2017 16:16	60.780513, -151.430343	-1.27	12.13	46776	27.84	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.59	477.1

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

-- Buoy was removed from the water and repositioned.

Table B5: Validated Buoy Drift 4 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 16:17	60.780693, -151.430099	-1.26	12.11	46707	27.80	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.53	500.8
3/24/2017 16:18	60.780864, -151.429885	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.55	522.9
3/24/2017 16:19	60.781013, -151.429718	-1.28	12.12	46774	27.84	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.48	541.7
3/24/2017 16:20	60.781192, -151.429519	-1.28	12.11	46802	27.86	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.40	564.3
3/24/2017 16:21	60.781372, -151.42929	-1.27	12.11	46826	27.88	<0.1	<10,000	<0.1%	20.910	<2%	27.04	1.51	587.7
3/24/2017 16:22	60.781547, -151.42897	-1.3	12.13	46798	27.85	<0.1	<10,000	<0.1%	20.910	<2%	61.78	2.44	612.7

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

-- Buoy was removed from the water and repositioned.

Table B6: Validated Buoy Drift 5 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 5: Friday, 3/24/2017													
3/24/2017 16:50	60.778907, -151.430801	-0.16	11.93	44026	26.34	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.35	307.2
3/24/2017 16:51	60.778987, -151.430786	NR	NR	NR	NR	NR	<10,000	<0.1%	20.910	<2%	239.22	1.01	315.2
3/24/2017 16:52	60.778915, -151.430969	-0.93	12.14	45962	27.41	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	303.2
3/24/2017 16:53	60.778835, -151.431121	-0.98	12.10	46071	27.47	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.85	291.3
3/24/2017 16:54	60.778728, -151.431289	-1.09	12.12	46287	27.58	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.77	276.4
3/24/2017 16:55	60.778629, -151.431472	-1.14	12.11	46419	27.65	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.83	261.9
3/24/2017 16:56	60.77853, -151.431671	-1.16	12.13	46498	27.69	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.92	247.1
3/24/2017 16:57	60.778419, -151.431869	-1.18	12.11	46537	27.71	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.87	231.1
3/24/2017 16:58	60.778316, -151.432083	-1.21	12.13	46590	27.74	<0.1	<10,000	<0.1%	20.910	<2%	239.22	0.98	215.7
3/24/2017 16:59	60.778198, -151.432342	-1.23	12.11	46756	27.84	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.16	197.8
3/24/2017 17:00	60.778076, -151.432632	-1.25	12.12	46761	27.84	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.22	179.1
3/24/2017 17:01	60.777935, -151.432937	-1.26	12.13	46767	27.84	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.31	158.8
3/24/2017 17:02	60.777801, -151.433258	NR	12.15	46804	27.87	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.37	139.7
3/24/2017 17:03	60.777645, -151.433578	-1.25	12.13	46804	27.87	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.48	119.6
3/24/2017 17:04	60.777473, -151.433914	-1.24	12.11	46853	27.90	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.44	99.6
3/24/2017 17:05	60.777313, -151.434265	-1.25	12.12	46835	27.88	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.66	84.9
3/24/2017 17:06	60.777126, -151.434631	-1.27	12.12	46874	27.91	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.68	74.4
3/24/2017 17:07	60.77695, -151.435012	-1.27	12.12	46852	27.89	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.79	75.7
3/24/2017 17:08	60.776767, -151.435424	-1.27	NR	NR	NR	NR	<10,000	<0.1%	20.910	<2%	239.22	1.66	88.3
3/24/2017 17:09	60.776569, -151.435806	-1.26	12.12	46874	27.91	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.77	106.5
3/24/2017 17:10	60.776371, -151.436203	-1.27	12.12	46884	27.91	<0.1	<10,000	<0.1%	20.910	<2%	239.22	1.87	130.1
3/24/2017 17:11	60.776165, -151.436645	-1.27	12.12	46894	27.92	<0.1	<10,000	<0.1%	20.910	<2%	239.22	2.00	158.8
3/24/2017 17:12	60.775947, -151.437133	-1.28	12.12	46897	27.92	<0.1	<10,000	<0.1%	20.910	<2%	227.70	2.09	191.8

NR – Instrument did not record a reading at this time interval

Table B6: Validated Buoy Drift 5 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 17:13	60.77573, -151.437622	-1.29	12.13	46858	27.89	<0.1	<10,000	<0.1%	20.910	<2%	228.38	2.16	225.7
3/24/2017 17:14	60.775508, -151.43814	-1.3	12.13	46903	27.92	<0.1	<10,000	<0.1%	20.880	<2%	226.79	2.18	261.8
3/24/2017 17:15	60.775283, -151.43869	-1.28	12.11	46936	27.94	<0.1	<10,000	<0.1%	20.910	<2%	228.51	2.35	299.9
3/24/2017 17:16	60.775047, -151.439224	-1.3	12.13	46903	27.92	<0.1	<10,000	<0.1%	20.910	<2%	226.96	2.48	338.1
3/24/2017 17:17	60.774803, -151.439788	-1.29	12.13	46904	27.92	<0.1	<10,000	<0.1%	20.880	<2%	227.80	2.50	378.3
3/24/2017 17:18	60.774532, -151.440383	-1.3	12.13	46952	27.95	<0.1	<10,000	<0.1%	20.880	<2%	226.14	2.53	421.6
3/24/2017 17:19	60.774261, -151.440963	-1.27	12.12	46966	27.97	<0.1	<10,000	<0.1%	20.880	<2%	225.83	2.51	464.5
3/24/2017 17:20	60.77399, -151.441543	-1.27	12.12	46951	27.96	<0.1	<10,000	<0.1%	20.880	<2%	224.20	2.44	507.5
3/24/2017 17:21	60.773715, -151.442108	-1.26	12.12	46981	27.98	<0.1	<10,000	<0.1%	20.910	<2%	224.84	2.55	550.1
3/24/2017 17:22	60.773426, -151.442733	-1.22	12.12	46998	28.00	<0.1	<10,000	<0.1%	20.910	<2%	225.20	2.68	596.4
3/24/2017 17:23	60.773132, -151.443344	-1.31	12.13	46930	27.93	<0.1	<10,000	<0.1%	20.910	<2%	221.34	2.48	642.5
3/24/2017 17:24	60.772834, -151.443954	-1.29	12.13	46970	27.96	<0.1	<10,000	<0.1%	20.880	<2%	223.32	2.72	688.9
3/24/2017 17:25	60.772518, -151.444595	-1.3	12.12	46953	27.95	<0.1	<10,000	<0.1%	20.880	<2%	224.80	2.77	737.9
3/24/2017 17:26	60.772201, -151.445251	-1.28	12.13	46958	27.96	<0.1	<10,000	<0.1%	20.880	<2%	224.08	3.01	787.7
3/24/2017 17:27	60.771873, -151.445907	-1.27	12.13	46984	27.98	<0.1	<10,000	<0.1%	20.910	<2%	224.42	3.01	838.2
3/24/2017 17:28	60.77153, -151.446563	-1.26	12.12	46970	27.97	<0.1	<10,000	<0.1%	20.941	<2%	222.30	3.16	889.9
3/24/2017 17:29	60.770973, -151.447586	-1.24	12.12	46983	27.99	<0.1	<10,000	<0.1%	20.880	<2%	220.25	3.22	972.2
3/24/2017 17:30	60.770793, -151.447906	-1.24	NR	NR	NR	NR	NR	NR	NR	NR	220.98	3.18	998.4
3/24/2017 17:31	60.77042, -151.448623	-1.24	12.12	46980	27.98	<0.1	<10,000	<0.1%	20.910	<2%	223.41	3.57	1054.9
3/24/2017 17:32	60.770034, -151.44934	-1.23	12.12	46994	27.99	<0.1	<10,000	<0.1%	20.910	<2%	222.85	3.48	1112.4
3/24/2017 17:33	60.769638, -151.450088	-1.23	12.12	46976	27.99	<0.1	<10,000	<0.1%	20.910	<2%	221.62	3.57	1171.9
3/24/2017 17:34	60.769237, -151.450851	-1.23	12.12	46982	27.99	<0.1	<10,000	<0.1%	20.910	<2%	221.40	3.81	1232.5
3/24/2017 17:35	60.768795, -151.45166	-1.22	12.12	46994	28.00	<0.1	<10,000	<0.1%	20.910	<2%	221.85	3.98	1298.0
3/24/2017 17:36	60.768341, -151.452468	-1.21	12.11	47026	28.02	<0.1	<10,000	<0.1%	20.910	<2%	218.27	4.03	1364.4

NR – Instrument did not record a reading at this time interval

Table B6: Validated Buoy Drift 5 March 24, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/24/2017 17:37	60.767871, -151.453262	-1.22	12.12	47005	28.01	<0.1	<10,000	<0.1%	20.910	<2%	219.18	4.01	1431.4
3/24/2017 17:38	60.767395, -151.454055	-1.24	12.12	47006	28.01	<0.1	<10,000	<0.1%	20.910	<2%	219.44	4.07	1499.0
3/24/2017 17:39	60.766914, -151.454849	-1.23	12.12	47005	28.00	<0.1	<10,000	<0.1%	20.910	<2%	218.23	4.29	1567.0
3/24/2017 17:40	60.766426, -151.455688	-1.25	12.12	47018	28.01	<0.1	<10,000	<0.1%	20.910	<2%	219.03	4.12	1637.4
3/24/2017 17:41	60.765914, -151.456527	-1.26	12.11	46989	27.99	<0.1	<10,000	<0.1%	20.910	<2%	218.31	4.35	1709.7
3/24/2017 17:42	60.765399, -151.457366	-1.24	12.12	47060	28.03	<0.1	<10,000	<0.1%	20.880	<2%	218.81	4.48	1782.3
3/24/2017 17:43	60.764862, -151.458221	-1.24	12.11	47013	28.01	<0.1	<10,000	<0.1%	20.910	<2%	216.26	4.24	1857.3
3/24/2017 17:44	60.764316, -151.459091	-1.24	12.12	47058	28.03	<0.1	<10,000	<0.1%	20.880	<2%	219.70	4.92	1933.5
3/24/2017 17:45	60.763767, -151.459976	-1.26	12.12	47079	28.05	<0.1	<10,000	<0.1%	20.880	<2%	217.31	4.35	2010.7
3/24/2017 17:46	60.763195, -151.460861	-1.25	12.12	47116	28.07	<0.1	<10,000	<0.1%	20.910	<2%	NR	NR	2089.7
3/24/2017 17:47	60.762599, -151.461837	-1.25	12.10	47051	28.03	<0.1	<10,000	<0.1%	20.880	<2%	226.29	5.75	2174.2

NR – Instrument did not record a reading at this time interval

Table B7: Validated Buoy Drift 1 March 26, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1: Sunday, 3/26/2017													
3/26/2017 9:35	60.78498, -151.419479	-1.13	12.51	46194	27.50	<0.1	<10,000	<0.1%	20.925	<2%	224.04	7.13	1217.0
3/26/2017 9:36	60.784172, -151.421005	-1.23	12.34	45987	27.34	<0.1	<10,000	<0.1%	20.925	<2%	223.41	7.22	1095.0
3/26/2017 9:37	60.78339, -151.422607	-1.23	12.32	44970	26.68	<0.1	<10,000	<0.1%	20.925	<2%	224.58	7.14	972.6
3/26/2017 9:38	60.782615, -151.424148	-1.27	12.32	44756	26.53	Invalid	<10,000	<0.1%	20.925	<2%	224.14	7.16	853.1
3/26/2017 9:39	60.781826, -151.425674	-1.3	12.26	44753	26.52	Invalid	<10,000	<0.1%	20.925	<2%	223.60	7.16	733.0
3/26/2017 9:40	60.781024, -151.427215	-1.31	12.25	44601	26.42	<0.1	<10,000	<0.1%	20.925	<2%	222.22	7.35	611.5
3/26/2017 9:41	60.7802, -151.428771	-1.32	12.27	44455	26.32	<0.1	<10,000	<0.1%	20.925	<2%	223.62	7.16	488.0
3/26/2017 9:42	60.779373, -151.430404	-1.35	12.27	44400	26.28	<0.1	<10,000	<0.1%	20.925	<2%	223.62	7.77	362.6
3/26/2017 9:43	60.778606, -151.431991	-1.36	12.26	44299	26.21	<0.1	<10,000	<0.1%	20.925	<2%	226.95	7.11	247.0
3/26/2017 9:44	60.777801, -151.433547	-1.37	NR	NR	NR	<0.1	<10,000	<0.1%	20.894	<2%	225.28	7.11	137.0
3/26/2017 9:45	60.776706, -151.435668	-1.37	12.31	43535	25.72	<0.1	<10,000	<0.1%	20.894	<2%	220.84	7.33	100.0
3/26/2017 9:46	60.775844, -151.437194	-1.39	12.34	43113	25.44	<0.1	NR	NR	NR	NR	222.89	7.57	199.3
3/26/2017 9:47	60.775054, -151.438812	-1.39	12.28	44300	26.20	<0.1	<10,000	<0.1%	20.894	<2%	225.07	7.16	318.5
3/26/2017 9:48	60.774295, -151.440383	NR	NR	44276	26.19	<0.1	<10,000	<0.1%	20.925	<2%	226.38	7.37	436.4
3/26/2017 9:49	60.773483, -151.442016	-1.4	12.43	41793	24.59	<0.1	<10,000	<0.1%	20.925	<2%	223.23	7.46	561.5
3/26/2017 9:50	60.772659, -151.443527	-1.4	12.48	41751	24.56	<0.1	<10,000	<0.1%	20.925	<2%	222.81	7.20	682.8
3/26/2017 9:51	60.771842, -151.444992	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	220.33	7.09	802.3
3/26/2017 9:52	60.771018, -151.446426	-1.4	12.48	41700	24.53	<0.1	<10,000	<0.1%	20.925	<2%	221.11	7.24	921.4
3/26/2017 9:53	60.770191, -151.447921	-1.41	12.48	41726	24.54	<0.1	<10,000	<0.1%	20.925	<2%	223.01	7.01	1043.3
3/26/2017 9:54	60.769443, -151.449325	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	NR	NR	1155.9
3/26/2017 9:55	60.768684, -151.450714	-1.42	12.47	41588	24.45	<0.1	<10,000	<0.1%	20.894	<2%	221.85	6.68	1268.7
3/26/2017 9:56	60.767936, -151.452117	-1.42	12.47	41528	24.41	<0.1	<10,000	<0.1%	20.925	<2%	221.73	6.61	1381.3
3/26/2017 9:57	60.767181, -151.45346	-1.42	12.47	41358	24.30	NR	<10,000	<0.1%	20.925	<2%	219.51	6.63	1492.1

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B7: Validated Buoy Drift 1 March 26, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/26/2017 9:58	60.766391, -151.454772	-1.42	12.47	41205	24.20	<0.1	<10,000	<0.1%	20.925	<2%	218.86	6.72	1604.5
3/26/2017 9:59	60.765575, -151.4561	-1.43	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	218.89	7.03	1719.7
3/26/2017 10:00	60.764789, -151.457427	-1.43	12.47	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	219.46	6.61	1832.6
3/26/2017 10:01	60.764019, -151.458709	NR	12.47	41060	24.11	Invalid	<10,000	<0.1%	20.925	<2%	218.25	6.64	1942.5
3/26/2017 10:02	60.763225, -151.460006	-1.43	12.48	41039	24.10	<0.1	<10,000	<0.1%	20.894	<2%	218.79	6.53	2055.0
3/26/2017 10:03	60.762454, -151.461257	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	219.00	6.44	2163.9
3/26/2017 10:04	60.761199, -151.463394	NR	NR	NR	NR	Invalid	<10,000	<0.1%	20.925	<2%	220.65	6.46	2345.1
3/26/2017 10:05	60.760314, -151.46495	-1.43	12.48	40951	24.04	Invalid	<10,000	<0.1%	20.894	<2%	219.99	6.33	2474.7
3/26/2017 10:06	60.759578, -151.466201	-1.43	12.48	40936	24.03	<0.1	<10,000	<0.1%	20.925	<2%	NR	NR	2580.9
3/26/2017 10:07	60.758842, -151.467453	NR	NR	NR	NR	<0.1	<10,000	<0.1%	20.925	<2%	219.95	6.25	2687.2
3/26/2017 10:08	60.758148, -151.468627	-1.43	12.49	40934	24.03	Invalid	<10,000	<0.1%	20.925	<2%	218.23	5.83	2787.1
3/26/2017 10:09	60.757442, -151.469726	-1.44	12.47	40927	24.02	<0.1	<10,000	<0.1%	20.894	<2%	217.39	5.79	2885.3
3/26/2017 10:10	60.756748, -151.470855	-1.44	12.47	40959	24.04	<0.1	<10,000	<0.1%	20.894	<2%	219.42	5.72	2983.7
3/26/2017 10:11	60.756088, -151.471939	-1.44	12.47	40913	24.01	<0.1	<10,000	<0.1%	20.894	<2%	218.20	5.42	3077.6
3/26/2017 10:12	60.755424, -151.472991	-1.44	12.48	40871	23.99	<0.1	<10,000	<0.1%	20.925	<2%	218.27	5.27	3170.7
3/26/2017 10:13	60.75489, -151.473968	-1.44	12.48	40880	23.99	<0.1	<10,000	<0.1%	20.894	<2%	224.15	4.42	3250.3
3/26/2017 10:14	60.754409, -151.474914	-1.44	12.48	40634	23.83	<0.1	<10,000	<0.1%	20.925	<2%	223.46	4.35	3324.5
3/26/2017 10:15	60.753852, -151.475784	-1.44	12.48	40631	23.83	<0.1	<10,000	<0.1%	20.894	<2%	219.97	4.55	3402.1
3/26/2017 10:16	60.753326, -151.476715	-1.44	12.48	40575	23.80	<0.1	<10,000	<0.1%	20.925	<2%	223.52	4.40	3479.4
3/26/2017 10:17	60.752853, -151.477691	-1.44	12.50	40417	23.70	<0.1	<10,000	<0.1%	20.894	<2%	224.96	4.42	3554.0
3/26/2017 10:18	60.752365, -151.478591	-1.44	12.48	40496	23.75	Invalid	<10,000	<0.1%	20.925	<2%	219.62	4.16	3627.1
3/26/2017 10:19	60.751865, -151.479293	-1.44	12.46	41074	24.12	Invalid	<10,000	<0.1%	20.894	<2%	203.95	3.51	3693.9
3/26/2017 10:20	60.751346, -151.47998	-1.44	12.47	40945	24.03	<0.1	<10,000	<0.1%	20.894	<2%	211.13	3.98	3761.8
3/26/2017 10:21	60.75085, -151.480789	-1.45	12.49	40840	23.96	<0.1	<10,000	<0.1%	20.925	<2%	223.99	4.14	3832.2

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B7: Validated Buoy Drift 1 March 26, 2017

VALIDATED Data for March 24 and March 26, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/26/2017 10:22	60.750408, -151.481689	-1.45	12.83	34920	20.21	<0.1	<10,000	<0.1%	20.925	<2%	224.76	4.05	3901.5
3/26/2017 10:23	60.749916, -151.482574	-1.45	12.51	40931	24.02	<0.1	<10,000	<0.1%	20.925	<2%	222.70	4.18	3974.3

NR – Instrument did not record a reading at this time interval

Invalid – Original measurement determined to be the result of sensor damage and not a valid concentration observation

Table B8: Summary for Air / Water Interface Buoy Drifts March 29, 2017

Buoy Type	Drift Name	General Tide Description	Date	Release Time	Release Location	Retrieval Time	Retrieval Location	Drift Duration	Minimum Distance to MRP (m)	Wind (Knots/direction)	Wave Height (m)
Air / Water	D01-032917	Ebb	3/29/2017	12:32	60 46.823 N 151 25.37 W	12:53	60 45.751 N 151 27.264 W	0:21	148	12, SW	0
Air / Water	D02-032917	Ebb	3/29/2017	13:09	60 46.593 N 151 25.945 W	13:27	60 45.791 N 151 27.265 W	0:18	78	9, SW	0
Air / Water	D03-032917	End of Ebb/Slack	3/29/2017	13:47	60 46.588 N 151 25.926 W	14:48	60 46.609 N 151 25.97 W	1:01	17	3, SW	0
Air / Water	D04-032917	End of Slack/Flood	3/29/2017	15:25	60 46.432 N 151 26.378 W	15:36	60 46.976 N 151 25.618 W	0:11	114	Calm	0
Air / Water	D05-032917	Flood	3/29/2017	15:53	60 46.204 N 151 26.731 W	16:41	60 48.936 N 151 21.968 W	0:48	159	Calm	0

Table B9: Validated Buoy Drift 1 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1 - Wednesday 3/29/2017													
3/29/2017 12:32	60.780391, -151.422836	-0.86	12.17	44019	26.16	ERR	< 20	< 0.1	20.925	< 1	228.69	8.00	733
3/29/2017 12:33	60.77964, -151.424438	-1.02	12.23	44332	26.32	ERR	< 20	< 0.1	20.925	< 1	222.25	7.16	614
3/29/2017 12:34	60.778877, -151.426025	-1.08	12.22	44452	26.39	ERR	< 20	< 0.1	20.925	< 1	222.07	7.98	495
3/29/2017 12:35	60.778011, -151.427703	-1.15	12.24	44587	26.45	ERR	< 20	< 0.1	20.925	< 1	225.15	7.68	369
3/29/2017 12:36	60.777156, -151.429397	-1.18	12.24	44644	26.48	ERR	< 20	< 0.1	20.925	< 1	222.75	7.66	250
3/29/2017 12:37	60.776275, -151.430984	-1.19	12.23	44672	26.50	ERR	< 20	< 0.1	20.925	< 1	219.94	7.90	159
3/29/2017 12:38	60.775405, -151.432556	-1.25	12.26	44735	26.52	ERR	< 20	< 0.1	20.925	< 1	221.67	7.51	148
3/29/2017 12:39	60.774528, -151.434188	-1.24	12.22	44746	26.53	ERR	< 20	< 0.1	20.925	< 1	221.15	8.00	229
3/29/2017 12:40	60.773616, -151.435791	-1.26	12.24	44811	26.57	ERR	< 20	< 0.1	20.925	< 1	220.72	7.74	346
3/29/2017 12:41	60.772781, -151.437438	-1.27	12.23	44828	26.58	ERR	< 20	< 0.1	20.925	< 1	222.89	7.57	465
3/29/2017 12:42	60.771911, -151.439071	-1.28	12.24	44837	26.58	ERR	< 20	< 0.1	20.925	< 1	221.71	7.68	591
3/29/2017 12:43	60.771083, -151.440521	-1.3	12.25	44873	26.60	ERR	< 20	< 0.1	20.925	< 1	220.16	7.25	710
3/29/2017 12:44	60.770278, -151.441925	-1.31	12.26	44910	26.62	ERR	< 20	< 0.1	20.925	< 1	220.89	7.18	826
3/29/2017 12:45	60.769428, -151.443313	-1.31	12.25	44887	26.61	ERR	< 20	< 0.1	20.925	< 1	217.88	6.98	947
3/29/2017 12:46	60.768596, -151.444702	-1.31	12.25	44904	26.62	ERR	< 20	< 0.1	20.925	< 1	220.82	7.25	1065
3/29/2017 12:47	60.767738, -151.446151	-1.3	12.25	44924	26.63	ERR	< 20	< 0.1	20.925	< 1	220.07	7.38	1188
3/29/2017 12:48	60.766876, -151.44757	-1.32	12.25	44960	26.65	ERR	< 20	< 0.1	20.925	< 1	219.46	7.31	1311
3/29/2017 12:49	60.766033, -151.448989	-1.32	12.25	44989	26.67	ERR	< 20	< 0.1	20.925	< 1	219.91	7.24	1432
3/29/2017 12:50	60.765144, -151.450378	-1.32	12.25	45020	26.69	ERR	< 20	< 0.1	20.925	< 1	215.96	7.48	1556
3/29/2017 12:51	60.764247, -151.451751	-1.34	12.24	45078	26.72	ERR	< 20	< 0.1	20.925	< 1	215.48	7.24	1681
3/29/2017 12:52	60.763385, -151.453094	-1.33	12.23	45074	26.72	ERR	< 20	< 0.1	20.925	< 1	217.74	7.03	1801
3/29/2017 12:53	60.762512, -151.454406	-1.34	12.26	45066	26.71	ERR	< 20	< 0.1	20.925	< 1	214.65	7.03	1921

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B10: Validated Buoy Drift 2 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 2 - Wednesday 3/29/2017													
3/29/2017 13:09	60.776546, -151.432418	-0.97	12.12	45590	27.15	ERR	< 20	< 0.1	20.925	< 1	213.61	6.37	78
3/29/2017 13:10	60.775684, -151.43367	-1.1	12.17	45873	27.30	ERR	< 20	< 0.1	20.925	< 1	212.56	7.57	100
3/29/2017 13:11	60.774784, -151.43486	-1.18	12.20	46050	27.40	ERR	< 20	< 0.1	20.925	< 1	216.26	7.00	207
3/29/2017 13:12	60.774032, -151.436111	-1.21	12.19	46095	27.42	ERR	< 20	< 0.1	20.925	< 1	217.44	6.33	309
3/29/2017 13:13	60.773262, -151.437362	-1.23	12.19	46134	27.44	ERR	< 20	< 0.1	20.925	< 1	220.30	6.85	415
3/29/2017 13:14	60.772518, -151.438598	-1.24	12.18	46181	27.47	ERR	< 20	< 0.1	20.925	< 1	217.64	6.31	520
3/29/2017 13:15	60.771755, -151.439849	-1.26	12.19	46210	27.48	ERR	< 20	< 0.1	20.925	< 1	219.11	6.14	627
3/29/2017 13:16	60.771007, -151.441131	-1.26	12.19	46104	27.41	ERR	< 20	< 0.1	20.925	< 1	220.54	6.35	735
3/29/2017 13:17	60.770267, -151.442428	-1.27	12.19	46240	27.49	ERR	< 20	< 0.1	20.925	< 1	220.75	6.42	842
3/29/2017 13:18	60.769489, -151.44374	-1.28	12.18	46261	27.51	ERR	< 20	< 0.1	20.925	< 1	218.96	6.64	954
3/29/2017 13:19	60.768741, -151.444992	-1.28	12.20	46281	27.52	ERR	< 20	< 0.1	20.925	< 1	218.74	6.24	1061
3/29/2017 13:20	60.768013, -151.446197	-1.29	12.19	46311	27.54	ERR	< 20	< 0.1	20.925	< 1	220.26	5.85	1165
3/29/2017 13:21	60.767311, -151.447341	-1.3	12.19	46303	27.53	ERR	< 20	< 0.1	20.925	< 1	217.43	5.88	1264
3/29/2017 13:22	60.766624, -151.448501	-1.3	12.19	46303	27.53	ERR	< 20	< 0.1	20.925	< 1	219.44	5.92	1363
3/29/2017 13:23	60.765941, -151.449691	-1.3	12.19	46310	27.53	ERR	< 20	< 0.1	20.925	< 1	219.80	5.83	1462
3/29/2017 13:24	60.765232, -151.450912	-1.31	12.19	46322	27.54	ERR	< 20	< 0.1	20.925	< 1	221.10	6.09	1565
3/29/2017 13:25	60.764541, -151.452087	-1.31	12.20	46297	27.52	ERR	< 20	< 0.1	20.925	< 1	220.13	5.85	1665
3/29/2017 13:26	60.763866, -151.453277	-1.32	12.18	46351	27.55	ERR	< 20	< 0.1	20.925	< 1	220.08	5.75	1764
3/29/2017 13:27	60.763187, -151.454421	-1.32	12.19	46335	27.54	ERR	< 20	< 0.1	20.925	< 1	216.78	5.85	1861

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B11: Validated Buoy Drift 3 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 3 - Wednesday 3/29/2017													
3/29/2017 13:47	60.77647, -151.432098	-1.07	12.67	37406	21.86	ERR	< 20	< 0.1	20.925	< 1	235.92	3.31	96
3/29/2017 13:48	60.776161, -151.432968	-1.16	12.70	37664	22.01	ERR	< 20	< 0.1	20.925	< 1	232.82	3.44	66
3/29/2017 13:49	60.77584, -151.433883	-1.2	12.72	37746	22.05	ERR	< 20	< 0.1	20.925	< 1	232.67	3.57	82
3/29/2017 13:50	60.775512, -151.434799	--	--	--	--	--	< 20	< 0.1	20.925	< 1	237.62	3.50	129
3/29/2017 13:51	60.775409, -151.436798	--	--	--	--	--	< 20	< 0.1	20.925	< 1	243.10	10.46	206
3/29/2017 13:52	60.774108, -151.438293	-0.21	12.02	42660	25.44	ERR	< 20	< 0.1	20.925	< 1	172.17	8.16	366
3/29/2017 13:53	60.774314, -151.436874	-0.26	11.92	41969	24.98	ERR	< 20	< 0.1	20.925	< 1	21.09	10.33	301
3/29/2017 13:54	60.775943, -151.435287	-0.04	11.98	42002	25.05	ERR	< 20	< 0.1	20.925	< 1	43.13	10.11	105
3/29/2017 13:55	60.776336, -151.434265	0.22	11.93	42493	25.43	ERR	44	< 0.1	20.925	< 1	117.58	1.40	35
3/29/2017 13:56	60.775653, -151.433456	0.36	11.78	41376	24.73	ERR	< 20	< 0.1	20.925	< 1	175.67	10.05	105
3/29/2017 13:57	60.774459, -151.435668	0.69	11.57	41233	24.71	ERR	< 20	< 0.1	20.925	< 1	256.62	9.79	256
3/29/2017 13:58	60.774562, -151.437561	1.14	11.45	40885	24.57	ERR	43	< 0.1	20.925	< 1	305.72	4.51	302
3/29/2017 13:59	60.774944, -151.437805	0.97	11.64	41063	24.65	ERR	43	< 0.1	20.925	< 1	47.00	2.61	281
3/29/2017 14:00	60.775321, -151.43692	1.17	11.66	40912	24.60	ERR	42	< 0.1	20.925	< 1	42.39	4.25	218
3/29/2017 14:01	60.775733, -151.43637	1.34	11.56	41459	24.99	ERR	42	< 0.1	20.925	< 1	30.65	2.18	166
3/29/2017 14:02	60.77597, -151.435806	1.52	11.58	40724	24.54	ERR	42	< 0.1	20.925	< 1	56.11	2.94	126
3/29/2017 14:03	60.776027, -151.435165	1.51	11.52	41272	24.90	ERR	< 20	< 0.1	20.925	< 1	88.03	1.83	94
3/29/2017 14:04	60.77592, -151.435119	1.48	11.57	40420	24.33	ERR	< 20	< 0.1	20.925	< 1	88.03	0.00	101
3/29/2017 14:05	60.77602, -151.435058	1.39	11.48	41212	24.84	ERR	< 20	< 0.1	20.925	< 1	88.03	0.64	90
3/29/2017 14:06	60.776107, -151.435043	1.53	11.50	40331	24.28	ERR	41	< 0.1	20.925	< 1	88.03	0.94	84
3/29/2017 14:07	60.776241, -151.434936	0.9	12.19	31564	18.50	ERR	41	< 0.1	20.925	< 1	60.51	0.51	70
3/29/2017 14:08	60.776252, -151.434768	1.28	12.11	31061	18.23	ERR	40	< 0.1	20.925	< 1	55.79	2.44	62
3/29/2017 14:09	60.77626, -151.434661	1.3	12.12	31427	18.47	ERR	< 20	< 0.1	20.925	< 1	91.12	0.42	57
3/29/2017 14:10	60.776279, -151.43457	1.39	12.11	31062	18.25	ERR	< 20	< 0.1	20.925	< 1	75.16	0.37	52

-- Buoy was removed from the water and repositioned.

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B11: Validated Buoy Drift 3 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/29/2017 14:11	60.776374, -151.434509	1.34	12.00	31461	18.50	ERR	40	< 0.1	20.925	< 1	75.16	0.79	43
3/29/2017 14:12	60.776428, -151.434585	1.27	12.08	31919	18.78	ERR	39	< 0.1	20.925	< 1	75.16	0.88	44
3/29/2017 14:13	60.77647, -151.434631	1.32	12.06	31437	18.48	ERR	39	< 0.1	20.925	< 1	75.16	0.85	44
3/29/2017 14:14	60.776603, -151.434494	1.54	12.04	31749	18.71	ERR	39	< 0.1	20.925	< 1	75.16	1.37	35
3/29/2017 14:15	60.776725, -151.434341	1.69	12.00	31981	18.88	ERR	< 20	< 0.1	20.925	< 1	75.16	0.27	32
3/29/2017 14:16	60.776668, -151.434234	1.82	12.00	31699	18.72	ERR	60	< 0.1	20.925	< 1	75.16	0.66	23
3/29/2017 14:17	60.776477, -151.434082	1.95	11.87	31503	18.61	ERR	115	< 0.1	20.925	< 1	153.91	1.83	17
3/29/2017 14:18	60.776222, -151.434066	2.18	11.88	31203	18.45	ERR	60	< 0.1	20.925	< 1	153.91	1.94	41
3/29/2017 14:19	60.77597, -151.434219	2.4	11.70	31394	18.60	ERR	37	< 0.1	20.925	< 1	209.15	1.48	71
3/29/2017 14:20	60.77584, -151.434448	2.46	11.54	31296	18.54	ERR	37	< 0.1	20.925	< 1	209.15	0.94	88
3/29/2017 14:21	60.775848, -151.434616	2.67	11.53	30974	18.36	ERR	37	< 0.1	20.925	< 1	209.15	1.75	91
3/29/2017 14:22	60.776084, -151.434738	2.56	11.53	31423	18.64	ERR	36	< 0.1	20.925	< 1	209.15	2.05	73
3/29/2017 14:23	60.776275, -151.434906	2.5	11.58	31475	18.67	ERR	36	< 0.1	20.925	< 1	209.15	1.25	67
3/29/2017 14:24	60.776428, -151.434951	2.7	11.47	31529	18.73	ERR	57	< 0.1	20.925	< 1	209.15	1.24	62
3/29/2017 14:25	60.776565, -151.435028	2.9	11.37	31341	18.63	ERR	57	< 0.1	20.925	< 1	209.15	1.29	64
3/29/2017 14:26	60.776683, -151.434509	3.26	11.21	31014	18.46	ERR	90	< 0.1	20.925	< 1	69.39	2.09	38
3/29/2017 14:27	60.776741, -151.434112	-0.29	12.22	35413	20.75	ERR	34	< 0.1	20.894	< 1	56.74	0.74	23
3/29/2017 14:28	60.776813, -151.434188	-0.93	12.53	36575	21.36	ERR	56	< 0.1	20.925	< 1	56.74	0.98	32
3/29/2017 14:29	60.776958, -151.4346	-1.05	12.62	36833	21.50	ERR	56	< 0.1	20.925	< 1	301.34	1.59	59
3/29/2017 14:30	60.776943, -151.434387	-1.13	12.15	45121	26.81	ERR	55	< 0.1	20.925	< 1	301.34	0.96	50
3/29/2017 14:31	60.776885, -151.434005	-1.17	12.16	45183	26.83	ERR	88	< 0.1	20.925	< 1	137.32	1.05	35
3/29/2017 14:32	60.776935, -151.433746	-1.14	12.13	45172	26.84	ERR	76	< 0.1	20.925	< 1	137.32	0.90	40
3/29/2017 14:33	60.777061, -151.433654	-1.17	12.17	45180	26.83	ERR	54	< 0.1	20.925	< 1	137.32	1.05	55
3/29/2017 14:34	60.777221, -151.433532	-1.19	12.18	45206	26.85	ERR	87	< 0.1	20.925	< 1	137.32	1.61	73
3/29/2017 14:35	60.777492, -151.433486	--	--	--	--	--	31	< 0.1	20.925	< 1	336.42	2.53	103

-- Buoy was removed from the water and repositioned.

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B11: Validated Buoy Drift 3 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/29/2017 14:36	60.777454, -151.43341	--	--	--	--	--	< 20	< 0.1	20.925	< 1	238.12	0.94	100
3/29/2017 14:37	60.777202, -151.433609	--	--	--	--	--	< 20	< 0.1	20.925	< 1	181.06	2.22	71
3/29/2017 14:38	60.776901, -151.433792	-1.14	12.18	45459	27.02	ERR	30	< 0.1	20.925	< 1	141.07	1.07	36
3/29/2017 14:39	60.777088, -151.433715	-1.24	12.21	45617	27.10	ERR	< 20	< 0.1	20.925	< 1	141.07	1.90	57
3/29/2017 14:40	60.777023, -151.433822	--	--	--	--	--	< 20	< 0.1	20.925	< 1	240.12	1.25	50
3/29/2017 14:41	60.77713, -151.433959	--	--	--	--	--	< 20	< 0.1	20.925	< 1	345.29	1.12	62
3/29/2017 14:42	60.777229, -151.434051	--	--	--	--	--	< 20	< 0.1	20.925	< 1	333.54	0.62	73
3/29/2017 14:43	60.777423, -151.43402	--	--	--	--	--	< 20	< 0.1	20.925	< 1	333.54	1.88	94
3/29/2017 14:44	60.777736, -151.433944	--	--	--	--	--	< 20	< 0.1	20.925	< 1	6.01	0.79	129
3/29/2017 14:45	60.777339, -151.433624	--	--	--	--	--	< 20	< 0.1	20.925	< 1	154.06	1.98	85
3/29/2017 14:46	60.777248, -151.433349	--	--	--	--	--	82	< 0.1	20.925	< 1	154.06	0.92	79
3/29/2017 14:47	60.777381, -151.433059	--	--	--	--	--	< 20	< 0.1	20.925	< 1	38.37	2.14	99
3/29/2017 14:48	60.777618, -151.43283	--	--	--	--	--	26	< 0.1	20.925	< 1	33.13	1.51	128

-- Buoy was removed from the water and repositioned.

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B12: Validated Buoy Drift 4 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 4 - Wednesday 3/29/2017													
3/29/2017 15:25	60.77386, -151.439636	-1.23	12.32	45430	26.98	ERR	< 20	< 0.1	20.925	< 1	22.72	4.31	436
3/29/2017 15:26	60.774444, -151.43901	-1.24	12.27	45476	27.01	ERR	< 20	< 0.1	20.925	< 1	30.07	4.92	367
3/29/2017 15:27	60.775108, -151.43814	-1.13	12.29	45634	27.14	ERR	< 20	< 0.1	20.925	< 1	30.52	5.00	285
3/29/2017 15:28	60.77584, -151.437164	-1.23	12.26	45524	27.04	ERR	< 20	< 0.1	20.894	< 1	35.09	6.22	198
3/29/2017 15:29	60.776641, -151.436019	-1.24	12.25	45581	27.07	ERR	33	< 0.1	20.925	< 1	33.92	7.00	118
3/29/2017 15:30	60.777496, -151.434768	-1.25	12.24	45565	27.06	ERR	NR	< 0.1	NR	NR	36.71	7.22	114
3/29/2017 15:31	60.778369, -151.433486	-1.26	12.26	45554	27.05	ERR	< 20	< 0.1	20.925	< 1	36.14	7.51	200
3/29/2017 15:32	60.779258, -151.432174	-1.27	12.25	45573	27.06	ERR	< 20	< 0.1	20.925	< 1	36.15	7.48	311
3/29/2017 15:33	60.780166, -151.430892	-1.27	12.25	45554	27.05	ERR	< 20	< 0.1	20.925	< 1	33.39	7.35	430
3/29/2017 15:34	60.781063, -151.429626	-1.27	12.25	45561	27.05	ERR	< 20	< 0.1	20.925	< 1	34.00	7.64	549
3/29/2017 15:35	60.782001, -151.428314	-1.28	12.25	45558	27.05	ERR	31	< 0.1	20.925	< 1	35.45	7.64	674
3/29/2017 15:36	60.782939, -151.426971	-1.27	12.24	45571	27.06	ERR	< 20	< 0.1	20.925	< 1	35.76	7.74	800

NR – Instrument did not record a reading at this time interval.

ERR – Sensor malfunction confirmed. No valid data was collected.

Orange Highlights – Measurement suspected to be influenced by boat exhaust.

Table B13: Validated Buoy Drift 5 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 5 - Wednesday 3/29/2017													
3/29/2017 15:53	60.770069, -151.44551	-1.26	12.18	47338	28.21	ERR	< 20	< 0.1	20.925	< 1	36.83	6.11	962
3/29/2017 15:54	60.770812, -151.44432	-1.28	12.15	47321	28.20	ERR	< 20	< 0.1	20.894	< 1	32.83	7.83	857
3/29/2017 15:55	60.771831, -151.44313	-1.29	12.15	47424	28.26	ERR	< 20	< 0.1	20.894	< 1	29.63	9.53	730
3/29/2017 15:56	60.772987, -151.441772	-1.29	12.13	47460	28.28	ERR	< 20	< 0.1	20.894	< 1	29.90	9.01	587
3/29/2017 15:57	60.774135, -151.440414	-1.3	12.13	47515	28.32	ERR	< 20	< 0.1	20.925	< 1	31.50	9.29	448
3/29/2017 15:58	60.775321, -151.438919	-1.31	12.13	47542	28.33	ERR	< 20	< 0.1	20.925	< 1	32.95	9.66	309
3/29/2017 15:59	60.776523, -151.437347	-1.3	12.13	47569	28.35	ERR	< 20	< 0.1	20.925	< 1	33.71	9.94	190
3/29/2017 16:00	60.777683, -151.435699	-1.31	12.11	47580	28.36	ERR	< 20	< 0.1	20.925	< 1	38.34	9.53	159
3/29/2017 16:01	60.778846, -151.433929	-1.31	12.10	47622	28.38	ERR	< 20	< 0.1	20.925	< 1	35.82	9.68	252
3/29/2017 16:02	60.78004, -151.432159	-1.31	12.11	47599	28.37	ERR	< 20	< 0.1	20.894	< 1	35.00	10.01	396
3/29/2017 16:03	60.781204, -151.43048	-1.3	12.10	47630	28.39	ERR	< 20	< 0.1	20.894	< 1	35.00	9.33	546
3/29/2017 16:04	60.78231, -151.428771	-1.31	12.10	47622	28.38	ERR	< 20	< 0.1	20.925	< 1	38.04	9.61	694
3/29/2017 16:05	60.783405, -151.42694	-1.31	12.10	47624	28.38	ERR	< 20	< 0.1	20.925	< 1	39.03	9.77	846
3/29/2017 16:06	60.784534, -151.425094	-1.31	12.10	47617	28.38	ERR	< 20	< 0.1	20.925	< 1	39.22	9.88	1004
3/29/2017 16:07	60.785667, -151.423202	-1.31	12.10	47572	28.35	ERR	< 20	< 0.1	20.925	< 1	39.22	9.88	1164
3/29/2017 16:08	60.7868, -151.42134	-1.31	12.10	47619	28.38	ERR	< 20	< 0.1	20.894	< 1	39.70	9.55	1324
3/29/2017 16:09	60.787883, -151.419464	-1.31	12.11	47562	28.34	ERR	< 20	< 0.1	20.925	< 1	39.69	9.74	1479
3/29/2017 16:10	60.788967, -151.417602	-1.31	12.10	47521	28.32	ERR	< 20	< 0.1	20.894	< 1	41.10	9.29	1635
3/29/2017 16:11	60.789997, -151.415725	-1.31	12.10	47532	28.32	ERR	< 20	< 0.1	20.894	< 1	42.35	9.46	1787
3/29/2017 16:12	60.79103, -151.413787	-1.31	12.10	47531	28.32	ERR	< 20	< 0.1	20.894	< 1	40.69	9.22	1941
3/29/2017 16:13	60.792045, -151.411865	-1.31	12.11	47447	28.27	ERR	< 20	< 0.1	20.894	< 1	43.15	8.72	2093
3/29/2017 16:14	60.793025, -151.41014	-1.31	12.11	47442	28.27	ERR	NR	< 0.1	NR	NR	39.14	8.57	2236
3/29/2017 16:15	60.794036, -151.408416	-1.31	12.11	47445	28.27	ERR	NR	< 0.1	NR	NR	40.80	8.68	2381
3/29/2017 16:16	60.794963, -151.406799	-1.31	12.12	47393	28.23	ERR	< 20	< 0.1	20.925	< 1	38.73	8.27	2516
3/29/2017 16:17	60.795932, -151.405273	-1.31	12.11	47396	28.24	ERR	< 20	< 0.1	20.894	< 1	37.37	8.46	2652

NR – Instrument did not record a reading at this time interval.

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B13: Validated Buoy Drift 5 March 29, 2017

VALIDATED Data for March 29, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
3/29/2017 16:18	60.796928, -151.403594	-1.31	12.11	47498	28.30	ERR	< 20	< 0.1	20.925	< 1	41.31	8.74	2795
3/29/2017 16:19	60.797882, -151.401809	-1.31	12.10	47407	28.24	ERR	< 20	< 0.1	20.925	< 1	43.02	8.57	2938
3/29/2017 16:20	60.798805, -151.400039	-1.32	12.11	47399	28.24	ERR	< 20	< 0.1	20.894	< 1	42.87	8.48	3078
3/29/2017 16:21	60.799713, -151.398254	-1.31	12.11	47298	28.17	ERR	< 20	< 0.1	20.894	< 1	44.64	8.09	3216
3/29/2017 16:22	60.800529, -151.396499	-1.31	12.11	47176	28.09	ERR	< 20	< 0.1	20.894	< 1	49.28	8.20	3346
3/29/2017 16:23	60.801368, -151.394668	-1.3	12.13	46992	27.97	ERR	< 20	< 0.1	20.925	< 1	43.28	8.33	3481
3/29/2017 16:24	60.802261, -151.393096	-1.3	12.14	46980	27.97	ERR	< 20	< 0.1	20.894	< 1	39.33	7.77	3611
3/29/2017 16:25	60.80315, -151.391677	-1.31	12.14	47035	28.00	ERR	< 20	< 0.1	20.925	< 1	42.74	7.37	3737
3/29/2017 16:26	60.803981, -151.390136	-1.31	12.12	47159	28.08	ERR	< 20	< 0.1	20.894	< 1	40.78	7.74	3861
3/29/2017 16:27	60.804862, -151.388565	-1.31	12.13	47086	28.03	ERR	< 20	< 0.1	20.894	< 1	40.85	7.94	3990
3/29/2017 16:28	60.805751, -151.386993	-1.31	12.13	47053	28.01	ERR	< 20	< 0.1	20.894	< 1	41.75	7.96	4121
3/29/2017 16:29	60.806606, -151.385391	-1.31	12.12	47171	28.09	ERR	< 20	< 0.1	20.894	< 1	41.46	7.79	4249
3/29/2017 16:30	60.807449, -151.383819	-1.31	12.13	46956	27.95	ERR	< 20	< 0.1	20.925	< 1	41.89	7.68	4376
3/29/2017 16:31	60.808292, -151.382247	-1.31	12.14	47042	28.00	ERR	< 20	< 0.1	20.894	< 1	43.01	7.72	4502
3/29/2017 16:32	60.809123, -151.38063	-1.31	12.14	47035	28.00	ERR	< 20	< 0.1	20.925	< 1	43.42	7.68	4629
3/29/2017 16:33	60.809921, -151.378997	-1.31	12.15	46891	27.91	ERR	< 20	< 0.1	20.925	< 1	44.43	7.57	4753
3/29/2017 16:34	60.81068, -151.37738	-1.31	12.15	46856	27.88	ERR	< 20	< 0.1	20.894	< 1	45.58	7.33	4874
3/29/2017 16:35	60.811416, -151.375793	-1.31	12.15	46832	27.87	ERR	< 20	< 0.1	20.894	< 1	47.29	7.18	4992
3/29/2017 16:36	60.812168, -151.374114	-1.31	12.15	46896	27.91	ERR	< 20	< 0.1	20.925	< 1	46.92	7.64	5114
3/29/2017 16:37	60.812923, -151.372467	-1.31	12.15	46884	27.90	ERR	< 20	< 0.1	20.894	< 1	47.23	7.46	5236
3/29/2017 16:38	60.813655, -151.370803	-1.31	12.14	46970	27.96	ERR	< 20	< 0.1	20.894	< 1	47.35	7.33	5356
3/29/2017 16:39	60.814292, -151.369201	-1.31	12.13	46981	27.96	ERR	< 20	< 0.1	20.925	< 1	52.01	6.79	5466
3/29/2017 16:40	60.814945, -151.367523	-1.31	12.15	46812	27.85	ERR	< 20	< 0.1	20.894	< 1	47.44	6.94	5580
3/29/2017 16:41	60.815601, -151.366134	-1.32	12.15	46797	27.84	ERR	< 20	< 0.1	20.925	< 1	44.03	7.20	5685

NR – Instrument did not record a reading at this time interval.

ERR – Sensor malfunction confirmed. No valid data was collected.

Table B14 : Summary for Air / Water Interface Buoy Drifts April 12, 2017

Buoy Type	Drift Name	General Tide Description	Date	Release Time	Release Location	Retrieval Time	Retrieval Location	Drift Duration	Minimum Distance to MRP (m)	Wind (Knots/direction)	Wave Height (m)
Air / Water	D01-041217	Ebb	4/12/2017	11:17	60 47.326 N 151 24.644 W	12:19	60 44.052 N 151 30.185 W	1:02	37	Calm	0
Air / Water	D02-041217	Ebb	4/12/2017	13:00	60 46.906 N 151 25.304 W	13:29	60 45.903 N 151 27.200 W	0:29	65	Calm	0
Air / Water	D03-041217	Flood	4/12/2017	15:29	60 45.978 N 151 26.763 W	16:06	60 48.035 N 151 23.865 W	0:37	68	Calm	0
Air / Water	D04-041217	Flood	4/12/2017	16:28	60 46.740 N 151 25.808 W	16:38	60 46.717 N 151 25.863 W	0:10	242	Calm	0

Table B15: Validated Buoy Drift 1 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1 - Wednesday 4/12/2017													
4/12/17 11:17 AM	60.788768, -151.410736	0.93	11.39	45064	27.29	<0.1	55 ⁽¹⁾	< 0.1	20.955	< 1	237.29	7.51	1846
4/12/17 11:18 AM	60.788051, -151.412628	0.64	11.66	44933	27.13	<0.1	88 ⁽¹⁾	< 0.1	20.955	< 1	230.92	8.11	1718
4/12/17 11:19 AM	60.787147, -151.414337	0.45	11.73	45081	27.18	<0.1	88 ⁽¹⁾	< 0.1	20.955	< 1	225.44	8.33	1582
4/12/17 11:20 AM	60.786209, -151.416137	0.34	11.77	45092	27.17	<0.1	33 ⁽¹⁾	< 0.1	20.955	< 1	222.77	8.48	1439
4/12/17 11:21 AM	60.785305, -151.417846	0.25	11.80	45161	27.19	<0.1	<20 ⁽¹⁾	< 0.1	20.955	< 1	222.24	8.05	1302
4/12/17 11:22 AM	60.784404, -151.419509	0.15	11.83	45210	27.20	<0.1	<20 ⁽¹⁾	< 0.1	20.986	< 1	222.71	7.74	1167
4/12/17 11:23 AM	60.783504, -151.421127	0.12	11.85	45074	27.10	<0.1	<20 ⁽¹⁾	< 0.1	20.955	< 1	221.97	7.83	1034
4/12/17 11:24 AM	60.782623, -151.422836	0.08	11.86	45266	27.22	<0.1	55 ⁽¹⁾	< 0.1	20.955	< 1	224.41	8.16	899
4/12/17 11:25 AM	60.781707, -151.424606	0.04	11.85	45302	27.23	<0.1	66 ⁽¹⁾	< 0.1	20.955	< 1	220.31	8.48	759
4/12/17 11:26 AM	60.78075, -151.426406	0.05	11.85	45449	27.33	<0.1	<20 ⁽¹⁾	< 0.1	20.955	< 1	222.01	8.35	615
4/12/17 11:27 AM	60.779743, -151.428176	0.00	11.86	45681	27.47	<0.1	33 ⁽¹⁾	< 0.1	20.925	< 1	220.94	8.61	467
4/12/17 11:28 AM	60.778778, -151.429885	-0.04	11.86	45794	27.53	<0.1	55 ⁽¹⁾	< 0.1	20.925	< 1	220.72	8.44	326
4/12/17 11:29 AM	60.777767, -151.43164	-0.06	11.85	45904	27.60	<0.1	<20	< 0.1	20.925	< 1	221.16	8.57	178
4/12/17 11:30 AM	60.776802, -151.433349	-0.06	11.85	45896	27.60	<0.1	<20	< 0.1	20.925	< 1	221.63	8.50	37
4/12/17 11:31 AM	60.775821, -151.435058	-0.06	11.85	45938	27.62	<0.1	110 ⁽²⁾	< 0.1	20.925	< 1	219.65	8.24	107
4/12/17 11:32 AM	60.774845, -151.436676	-0.09	11.87	45967	27.64	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	218.91	8.33	246
4/12/17 11:33 AM	60.773838, -151.438278	-0.12	11.89	46011	27.66	<0.1	33 ⁽²⁾	< 0.1	20.925	< 1	217.27	8.48	388
4/12/17 11:34 AM	60.772823, -151.439926	-0.10	11.88	46003	27.66	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	218.69	8.55	532
4/12/17 11:35 AM	60.771827, -151.441574	-0.11	11.87	46039	27.68	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	220.04	8.31	675
4/12/17 11:36 AM	60.770843, -151.443176	-0.14	11.88	46087	27.70	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	217.12	8.18	814
4/12/17 11:37 AM	60.769855, -151.444747	-0.14	11.88	46117	27.72	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	217.18	8.18	953
4/12/17 11:38 AM	60.768886, -151.446289	-0.16	11.88	46115	27.71	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	218.47	8.18	1090

⁽¹⁾ Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

⁽²⁾ Erratic sensor performance and measurements suspected to be related to insufficient acclimation to ambient temperature conditions.

Table B15: Validated Buoy Drift 1 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 11:39 AM	60.767887, -151.447875	-0.17	11.90	46147	27.73	<0.1	33 ⁽²⁾	< 0.1	20.925	< 1	216.48	8.11	1230
4/12/17 11:40 AM	60.766906, -151.449417	-0.16	11.88	46119	27.72	<0.1	33 ⁽²⁾	< 0.1	20.925	< 1	217.60	8.33	1368
4/12/17 11:41 AM	60.765884, -151.451004	-0.16	11.90	46176	27.75	<0.1	<20 ⁽²⁾	< 0.1	20.894	< 1	216.57	8.46	1510
4/12/17 11:42 AM	60.764846, -151.45259	-0.16	11.88	46614	28.04	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	217.24	8.42	1654
4/12/17 11:43 AM	60.763835, -151.454162	-0.18	11.92	46612	28.04	<0.1	33 ⁽²⁾	< 0.1	20.925	< 1	216.42	8.09	1795
4/12/17 11:44 AM	60.762828, -151.455642	-0.18	11.93	46659	28.07	<0.1	33 ⁽²⁾	< 0.1	20.925	< 1	215.40	8.25	1933
4/12/17 11:45 AM	60.761779, -151.457153	-0.19	11.91	46738	28.12	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	214.45	8.46	2076
4/12/17 11:46 AM	60.760704, -151.458648	-0.18	11.97	45803	27.50	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	214.41	8.50	2220
4/12/17 11:47 AM	60.759654, -151.460144	-0.19	11.96	45812	27.51	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	214.42	8.42	2362
4/12/17 11:48 AM	60.758598, -151.461624	-0.19	11.95	45820	27.51	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	214.94	8.70	2504
4/12/17 11:49 AM	60.757549, -151.463134	-0.19	11.96	45862	27.54	<0.1	55 ⁽²⁾	< 0.1	20.925	< 1	214.60	8.38	2647
4/12/17 11:50 AM	60.756507, -151.464523	-0.19	11.95	45878	27.55	<0.1	77 ⁽²⁾	< 0.1	20.925	< 1	212.19	7.81	2785
4/12/17 11:51 AM	60.755516, -151.46585	-0.19	11.95	45850	27.53	<0.1	88 ⁽²⁾	< 0.1	20.925	< 1	214.78	7.63	2916
4/12/17 11:52 AM	60.754562, -151.467193	-0.20	11.95	45877	27.55	<0.1	66 ⁽²⁾	< 0.1	20.925	< 1	214.82	7.33	3045
4/12/17 11:53 AM	60.753704, -151.468536	-0.21	11.94	45866	27.54	<0.1	110 ⁽²⁾	< 0.1	20.925	< 1	219.41	7.00	3165
4/12/17 11:54 AM	60.752971, -151.469879	-0.20	11.94	45867	27.54	<0.1	77 ⁽²⁾	< 0.1	20.925	< 1	221.20	6.00	3274
4/12/17 11:55 AM	60.752285, -151.47116	-0.20	11.93	45867	27.54	<0.1	66 ⁽²⁾	< 0.1	20.925	< 1	222.55	6.05	3376
4/12/17 11:56 AM	60.751609, -151.472427	-0.20	11.92	45878	27.55	<0.1	55 ⁽²⁾	< 0.1	20.894	< 1	221.93	6.16	3478
4/12/17 11:57 AM	60.750907, -151.473693	-0.20	11.94	45884	27.55	<0.1	55 ⁽²⁾	< 0.1	20.925	< 1	220.83	6.07	3582
4/12/17 11:58 AM	60.750217, -151.47496	-0.20	11.92	45984	27.62	<0.1	55 ⁽²⁾	< 0.1	20.925	< 1	223.09	6.00	3684
4/12/17 11:59 AM	60.749507, -151.476226	-0.20	11.92	45990	27.62	<0.1	77 ⁽²⁾	< 0.1	20.925	< 1	221.53	6.38	3789
4/12/17 12:00 PM	60.748813, -151.4776	-0.20	11.92	46031	27.65	<0.1	55 ⁽²⁾	< 0.1	20.925	< 1	225.01	5.94	3895
4/12/17 12:01 PM	60.748142, -151.479003	-0.20	11.92	46012	27.64	<0.1	66 ⁽²⁾	< 0.1	20.925	< 1	223.56	6.46	4001
4/12/17 12:02 PM	60.747451, -151.480407	-0.20	11.92	46032	27.65	<0.1	22 ⁽²⁾	< 0.1	20.925	< 1	222.44	6.53	4108
4/12/17 12:03 PM	60.746753, -151.481781	-0.20	11.91	46061	27.67	<0.1	33 ⁽²⁾	< 0.1	20.925	< 1	224.28	6.44	4216

⁽¹⁾ Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

⁽²⁾ Erratic sensor performance and measurements suspected to be related to insufficient acclimation to ambient temperature conditions.

Table B15: Validated Buoy Drift 1 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 12:04 PM	60.746044, -151.483169	-0.21	11.91	46072	27.67	<0.1	88 ⁽²⁾	< 0.1	20.986	< 1	223.81	6.55	4324
4/12/17 12:05 PM	60.745319, -151.484603	-0.21	11.92	46083	27.68	<0.1	77 ⁽²⁾	< 0.1	20.925	< 1	223.27	6.72	4436
4/12/17 12:06 PM	60.744579, -151.485961	-0.21	11.92	46082	27.68	<0.1	110 ⁽²⁾	< 0.1	20.925	< 1	221.25	6.35	4546
4/12/17 12:07 PM	60.743862, -151.487243	-0.21	11.92	46115	27.70	<0.1	44 ⁽²⁾	< 0.1	20.925	< 1	220.94	6.29	4652
4/12/17 12:08 PM	60.743122, -151.488525	-0.21	11.91	46129	27.71	<0.1	33 ⁽²⁾	< 0.1	20.894	< 1	219.66	6.48	4760
4/12/17 12:09 PM	60.742362, -151.489791	-0.21	11.90	46043	27.65	<0.1	55 ⁽²⁾	< 0.1	20.925	< 1	218.38	6.44	4868
4/12/17 12:10 PM	60.741615, -151.491119	-0.21	11.92	46060	27.66	<0.1	55 ⁽²⁾	< 0.1	20.925	< 1	221.58	6.66	4978
4/12/17 12:11 PM	60.740833, -151.492477	-0.21	11.91	46078	27.68	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	219.95	6.88	5092
4/12/17 12:12 PM	60.740028, -151.493835	-0.21	11.91	46071	27.67	<0.1	<20 ⁽²⁾	< 0.1	20.925	< 1	219.05	6.90	5208
4/12/17 12:13 PM	60.739219, -151.495162	-0.21	11.91	46092	27.69	<0.1	33 ⁽²⁾	< 0.1	20.986	< 1	218.93	6.75	5324
4/12/17 12:14 PM	60.738407, -151.49652	-0.21	11.91	46086	27.68	<0.1	88 ⁽²⁾	< 0.1	20.925	< 1	219.18	6.88	5440
4/12/17 12:15 PM	60.737586, -151.497848	-0.21	11.91	46123	27.71	<0.1	110 ⁽²⁾	< 0.1	20.925	< 1	217.78	6.96	5557
4/12/17 12:16 PM	60.73677, -151.49913	-0.20	11.90	46147	27.72	<0.1	110 ⁽²⁾	< 0.1	20.925	< 1	217.77	6.87	5671
4/12/17 12:17 PM	60.735939, -151.500503	-0.21	11.90	46151	27.73	<0.1	77 ⁽²⁾	< 0.1	20.925	< 1	218.38	7.14	5790
4/12/17 12:18 PM	60.735092, -151.501861	-0.21	11.91	46117	27.70	<0.1	55 ⁽²⁾	< 0.1	21.017	< 1	215.61	7.16	5909
4/12/17 12:19 PM	60.734199, -151.503082	-0.21	11.92	46055	27.66	<0.1	55 ⁽²⁾	< 0.1	20.955	< 1	216.13	7.13	6028

⁽¹⁾ Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

⁽²⁾ Erratic sensor performance and measurements suspected to be related to insufficient acclimation to ambient temperature conditions.

Table B16: Validated Buoy Drift 2 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 2 - Wednesday 4/12/2017													
4/12/17 1:00 PM	60.781761, -151.421737	1.29	11.04	42800	25.86	<0.1	22 ⁽¹⁾	< 0.1	21.017	< 1	56.14	1.51	874
4/12/17 1:01 PM	60.781452, -151.4225	0.44	11.72	44330	26.69	<0.1	<20	< 0.1	20.955	< 1	222.76	4.64	820
4/12/17 1:02 PM	60.780906, -151.423706	0.24	11.84	44725	26.90	<0.1	<20	< 0.1	20.955	< 1	228.93	6.07	731
4/12/17 1:03 PM	60.780334, -151.425064	0.14	NR	44927	27.01	<0.1	<20	< 0.1	20.955	< 1	226.05	5.50	634
4/12/17 1:04 PM	60.779685, -151.426376	0.15	11.86	44960	27.03	<0.1	<20	< 0.1	20.955	< 1	226.61	6.11	533
4/12/17 1:05 PM	60.779048, -151.427673	0.02	11.89	45152	27.13	<0.1	<20	< 0.1	20.955	< 1	224.56	5.70	433
4/12/17 1:06 PM	60.778388, -151.428863	-0.03	11.91	45256	27.18	<0.1	<20	< 0.1	20.955	< 1	220.31	6.05	337
4/12/17 1:07 PM	60.777755, -151.430145	-0.09	11.94	45336	27.22	<0.1	<20	< 0.1	20.955	< 1	227.20	5.85	240
4/12/17 1:08 PM	60.777141, -151.431427	-0.13	11.96	45416	27.26	<0.1	53	< 0.1	20.955	< 1	223.40	5.74	145
4/12/17 1:09 PM	60.776504, -151.432662	-0.16	11.97	45464	27.29	<0.1	74	< 0.1	20.925	< 1	221.98	6.24	65
4/12/17 1:10 PM	60.77584, -151.433868	-0.21	11.98	45542	27.32	<0.1	72	< 0.1	20.925	< 1	220.26	5.92	82
4/12/17 1:11 PM	60.775177, -151.434982	-0.18	11.96	45534	27.33	<0.1	60	< 0.1	20.925	< 1	218.56	5.63	168
4/12/17 1:12 PM	60.774528, -151.43608	-0.20	11.97	45563	27.34	<0.1	91	< 0.1	20.955	< 1	222.53	5.64	258
4/12/17 1:13 PM	60.773895, -151.437255	-0.22	11.97	45584	27.35	<0.1	90	< 0.1	20.925	< 1	221.90	5.74	351
4/12/17 1:14 PM	60.773239, -151.438461	-0.22	11.98	45610	27.37	<0.1	88	< 0.1	20.955	< 1	220.30	6.07	448
4/12/17 1:15 PM	60.772583, -151.439498	-0.23	11.99	45636	27.38	<0.1	32	< 0.1	20.925	< 1	216.70	5.88	540
4/12/17 1:16 PM	60.771961, -151.440475	-0.25	11.97	45672	27.40	<0.1	30	< 0.1	20.925	< 1	214.84	5.18	627
4/12/17 1:17 PM	60.77132, -151.441528	-0.26	11.97	45707	27.42	<0.1	<20	< 0.1	20.925	< 1	220.85	5.13	718
4/12/17 1:18 PM	60.770751, -151.442581	-0.28	12.00	45711	27.42	<0.1	27	< 0.1	20.955	< 1	219.43	5.09	803
4/12/17 1:19 PM	60.770156, -151.443572	-0.29	12.00	45735	27.43	<0.1	48	< 0.1	20.925	< 1	216.93	5.11	888
4/12/17 1:20 PM	60.769599, -151.444549	-0.30	11.99	45792	27.47	<0.1	24	< 0.1	20.925	< 1	230.52	5.05	969
4/12/17 1:21 PM	60.769149, -151.445358	-0.31	11.98	45785	27.46	<0.1	23	< 0.1	20.955	< 1	219.62	4.14	1036

(1) Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

NR – Measurement not recorded

Table B16: Validated Buoy Drift 2 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 1:22 PM	60.768604, -151.446197	-0.33	11.99	45789	27.46	<0.1	21	< 0.1	20.925	< 1	224.53	4.11	1112
4/12/17 1:23 PM	60.768115, -151.447204	-0.31	11.99	45833	27.49	<0.1	<20	< 0.1	20.955	< 1	223.05	4.72	1188
4/12/17 1:24 PM	60.767616, -151.448226	-0.31	12.00	45789	27.46	<0.1	<20	< 0.1	20.925	< 1	226.19	4.70	1266
4/12/17 1:25 PM	60.767116, -151.449279	-0.33	12.01	45839	27.49	<0.1	<20	< 0.1	20.894	< 1	225.59	4.94	1345
4/12/17 1:26 PM	60.766666, -151.450347	-0.33	12.00	45858	27.50	<0.1	<20	< 0.1	20.925	< 1	229.88	4.79	1420
4/12/17 1:27 PM	60.766201, -151.451538	-0.33	11.99	45834	27.48	<0.1	<20	< 0.1	20.925	< 1	230.32	4.83	1501
4/12/17 1:28 PM	60.765586, -151.452468	-0.31	11.99	45811	27.47	<0.1	<20	< 0.1	20.925	< 1	208.97	5.11	1586
4/12/17 1:29 PM	60.765048, -151.453338	-0.32	12.00	45799	27.46	<0.1	<20	< 0.1	20.925	< 1	221.67	4.77	1662

(1) Boat remained close to the buoy. Measurements suspected to be impacted by boat exhaust.

NR – Measurement not recorded

Table B17: Validated Buoy Drift 3 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 3 - Wednesday 4/12/2017													
4/12/17 3:29 PM	60.766288, -151.446044	0.58	11.69	43658	26.28	<0.1	<20	< 0.1	20.955	< 1	47.98	6.42	1322
4/12/17 3:30 PM	60.767078, -151.4449	0.34	11.83	44065	26.49	<0.1	<20	< 0.1	20.955	< 1	36.93	6.81	1215
4/12/17 3:31 PM	60.767974, -151.443664	0.24	11.87	44433	26.71	<0.1	<20	< 0.1	20.955	< 1	31.96	7.85	1095
4/12/17 3:32 PM	60.768959, -151.442352	0.15	11.91	44628	26.81	<0.1	<20	< 0.1	20.986	< 1	33.16	7.68	965
4/12/17 3:33 PM	60.769966, -151.441085	0.10	11.92	44706	26.85	<0.1	<20	< 0.1	20.986	< 1	31.53	8.05	834
4/12/17 3:34 PM	60.770973, -151.439849	0.05	11.93	44755	26.87	<0.1	<20	< 0.1	20.986	< 1	31.86	7.92	703
4/12/17 3:35 PM	60.772003, -151.438629	-0.03	11.96	44818	26.89	<0.1	<20	< 0.1	20.955	< 1	30.88	8.27	571
4/12/17 3:36 PM	60.772994, -151.437393	-0.03	11.95	44858	26.92	<0.1	<20	< 0.1	20.986	< 1	29.90	7.88	443
4/12/17 3:37 PM	60.774013, -151.436111	-0.06	11.97	44894	26.94	<0.1	<20	< 0.1	20.955	< 1	31.05	7.98	311
4/12/17 3:38 PM	60.775016, -151.434875	-0.06	11.97	44929	26.96	<0.1	<20	< 0.1	20.986	< 1	31.39	7.74	182
4/12/17 3:39 PM	60.775978, -151.433639	-0.09	11.97	44940	26.96	<0.1	<20	< 0.1	20.986	< 1	34.52	7.87	68
4/12/17 3:40 PM	60.776985, -151.432342	-0.11	11.99	44988	26.99	<0.1	<20	< 0.1	20.986	< 1	31.69	7.90	93
4/12/17 3:41 PM	60.778018, -151.431091	-0.12	11.99	45014	27.00	<0.1	<20	< 0.1	20.955	< 1	30.23	8.31	219
4/12/17 3:42 PM	60.779067, -151.429794	-0.13	11.97	45222	27.13	<0.1	<20	< 0.1	20.986	< 1	31.90	8.29	353
4/12/17 3:43 PM	60.780097, -151.428497	-0.12	12.01	45240	27.15	<0.1	<20	< 0.1	20.986	< 1	31.78	8.14	487
4/12/17 3:44 PM	60.781089, -151.427169	-0.14	12.01	45268	27.16	<0.1	<20	< 0.1	20.986	< 1	33.75	8.01	619
4/12/17 3:45 PM	60.782081, -151.425796	-0.14	12.02	45287	27.18	<0.1	<20	< 0.1	20.986	< 1	34.67	8.22	752
4/12/17 3:46 PM	60.783069, -151.424407	-0.12	12.01	45269	27.17	<0.1	<20	< 0.1	20.986	< 1	35.33	8.00	885
4/12/17 3:47 PM	60.784034, -151.423034	-0.16	12.01	45288	27.17	<0.1	<20	< 0.1	20.986	< 1	32.93	7.94	1016
4/12/17 3:48 PM	60.785007, -151.421737	-0.16	12.01	45244	27.14	<0.1	<20	< 0.1	20.955	< 1	34.17	7.66	1145
4/12/17 3:49 PM	60.785942, -151.420425	-0.18	12.01	45233	27.13	<0.1	<20	< 0.1	20.986	< 1	34.49	7.59	1271
4/12/17 3:50 PM	60.786907, -151.419113	-0.19	12.01	45255	27.14	<0.1	<20	< 0.1	20.955	< 1	34.05	7.77	1399

Table B17: Validated Buoy Drift 3 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
4/12/17 3:51 PM	60.787868, -151.417816	-0.19	12.02	45278	27.16	<0.1	<20	< 0.1	20.986	< 1	33.13	7.81	1527
4/12/17 3:52 PM	60.788833, -151.416534	-0.18	12.01	45281	27.16	<0.1	<20	< 0.1	20.986	< 1	35.22	7.70	1655
4/12/17 3:53 PM	60.78973, -151.415237	-0.17	12.01	45293	27.17	<0.1	<20	< 0.1	20.986	< 1	35.25	7.31	1777
4/12/17 3:54 PM	60.790607, -151.41394	-0.19	12.01	45292	27.16	<0.1	<20	< 0.1	20.986	< 1	34.80	7.25	1897
4/12/17 3:55 PM	60.791442, -151.412658	-0.21	12.03	45289	27.16	<0.1	<20	< 0.1	20.986	< 1	40.01	6.79	2013
4/12/17 3:56 PM	60.792251, -151.411361	-0.21	12.03	45313	27.17	<0.1	<20	< 0.1	20.986	< 1	37.02	7.09	2127
4/12/17 3:57 PM	60.793075, -151.41014	-0.20	12.03	45317	27.18	<0.1	<20	< 0.1	20.986	< 1	37.75	6.70	2240
4/12/17 3:58 PM	60.793876, -151.408874	-0.20	12.02	45316	27.18	<0.1	<20	< 0.1	20.955	< 1	39.04	6.77	2353
4/12/17 3:59 PM	60.794689, -151.407562	-0.20	12.01	45337	27.19	<0.1	<20	< 0.1	20.986	< 1	38.30	7.14	2467
4/12/17 4:00 PM	60.79552, -151.406204	-0.20	12.03	45340	27.19	<0.1	<20	< 0.1	20.986	< 1	40.03	7.29	2585
4/12/17 4:01 PM	60.796348, -151.40483	-0.21	12.03	45332	27.19	<0.1	<20	< 0.1	20.986	< 1	39.54	7.22	2704
4/12/17 4:02 PM	60.797206, -151.403442	-0.21	12.02	45328	27.18	<0.1	<20	< 0.1	20.986	< 1	37.92	7.25	2825
4/12/17 4:03 PM	60.798042, -151.402069	-0.21	12.02	45334	27.19	<0.1	<20	< 0.1	20.986	< 1	39.57	7.22	2944
4/12/17 4:04 PM	60.798866, -151.40068	-0.22	12.03	45321	27.18	<0.1	<20	< 0.1	20.955	< 1	39.03	7.22	3062
4/12/17 4:05 PM	60.79969, -151.399276	-0.23	12.01	45391	27.22	<0.1	<20	< 0.1	20.986	< 1	41.09	7.53	3181
4/12/17 4:06 PM	60.800582, -151.39775	-0.23	12.02	45392	27.22	<0.1	<20	< 0.1	20.986	< 1	42.82	8.46	3310

Table B18: Validated Buoy Drift 4 April 12, 2017

Validated Data for April 12, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 4 - Wednesday 4/12/2017													
4/12/17 4:28 PM	60.779006, -151.43013	0.58	11.62	46275	28.01	<0.1	132	< 0.1	20.986	< 1	245.02	0.38	337
4/12/17 4:29 PM	60.779003, -151.430084	0.35	11.77	46772	28.28	<0.1	132	< 0.1	20.955	< 1	245.02	0.59	338
4/12/17 4:30 PM	60.779003, -151.429992	0.25	11.80	46962	28.38	<0.1	132	< 0.1	20.955	< 1	245.02	0.37	341
4/12/17 4:31 PM	60.779003, -151.430099	0.21	11.82	46983	28.38	<0.1	165	< 0.1	20.955	< 1	245.02	0.51	338
4/12/17 4:32 PM	60.778999, -151.430191	0.16	11.81	47185	28.50	<0.1	165	< 0.1	20.955	< 1	245.02	0.09	334
4/12/17 4:33 PM	60.779026, -151.43013	0.14	11.82	47243	28.54	<0.1	165	< 0.1	20.955	< 1	245.02	0.01	339
4/12/17 4:34 PM	60.778961, -151.43013	0.13	12.02	43691	26.19	<0.1	187	< 0.1	20.955	< 1	245.02	0.53	333
4/12/17 4:35 PM	60.778675, -151.430541	0.12	11.84	46660	28.15	<0.1	187	< 0.1	20.986	< 1	216.87	3.72	294
4/12/17 4:36 PM	60.778278, -151.43106	0.11	11.81	47402	28.63	<0.1	154	< 0.1	20.955	< 1	212.06	1.46	242
4/12/17 4:37 PM	60.778373, -151.431213	0.10	11.79	47452	28.67	<0.1	165	< 0.1	20.986	< 1	212.06	1.87	245
4/12/17 4:38 PM	60.77861, -151.431045	0.10	11.79	47500	28.70	<0.1	55	< 0.1	20.986	< 1	19.18	2.05	272

Table B19 : Summary for Air / Water Interface Buoy Drifts May 2, 2017

Buoy Type	Drift Name	General Tide Description	Date	Release Time	Release Location	Retrieval Time	Retrieval Location	Drift Duration	Minimum Distance to MRP (m)	Wind (Knots/direction)	Wave Height (m)
Air / Water	D01-050217	End of Slack/Ebb	5/2/2017	10:42	60 46.460 N 151 26.377 W	12:30	60 45.662 N 151 28.396 W	1:48	164	10, N	1 - 2m

Table B20: Preliminary Buoy Drift 1 May 2, 2017

Preliminary Data for May 2, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
Launch 1 - Tuesday 5/2/2017													
5/2/17 10:42 AM	60.774333,-151.43962	2.64	11.24	46504	28.63	<0.1	ERR	<0.1	20.986	<1	0.75	3.92	401
5/2/17 10:43 AM	60.774528,-151.439498	2.51	11.31	46906	28.87	<0.1	ERR	<0.1	20.986	<1	35.83	0.87	382
5/2/17 10:44 AM	60.774715,-151.4393	2.44	11.34	46859	28.82	<0.1	ERR	<0.1	21.017	<1	33.62	1.5	361
5/2/17 10:45 AM	60.77494,-151.439041	2.41	11.34	46949	28.88	<0.1	ERR	<0.1	20.986	<1	24.64	1.01	336
5/2/17 10:46 AM	60.775161,-151.438796	2.37	11.35	47046	28.94	<0.1	ERR	<0.1	20.986	<1	28.93	1.09	312
5/2/17 10:47 AM	60.775382,-151.438507	2.36	11.34	47107	28.98	<0.1	ERR	<0.1	20.986	<1	70.36	2.4	286
5/2/17 10:48 AM	60.775585,-151.438262	2.35	11.34	47256	29.07	<0.1	ERR	<0.1	20.955	<1	57.85	1.46	264
5/2/17 10:49 AM	60.775768,-151.438018	2.34	11.33	47279	29.09	<0.1	ERR	<0.1	20.955	<1	17.76	1.01	244
5/2/17 10:50 AM	60.775955,-151.437789	2.33	11.33	47134	28.99	<0.1	ERR	<0.1	20.986	<1	32.49	2.4	225
5/2/17 10:51 AM	60.776142,-151.437606	2.33	11.34	47159	29.00	<0.1	ERR	<0.1	20.955	<1	20.65	0.81	210
5/2/17 10:52 AM	60.776336,-151.437423	2.32	11.35	47191	29.02	<0.1	ERR	<0.1	20.986	<1	42.22	2.35	196
5/2/17 10:53 AM	60.776512,-151.437225	2.31	NR	47181	29.01	<0.1	ERR	<0.1	20.955	<1	28.44	2.05	184
5/2/17 10:54 AM	60.776676,-151.437026	2.33	11.34	47208	29.04	<0.1	ERR	<0.1	20.986	<1	39.04	1.74	173
5/2/17 10:55 AM	60.776851,-151.436874	2.31	11.34	47214	29.04	<0.1	ERR	<0.1	20.955	<1	117.91	1.87	167
5/2/17 10:56 AM	60.777034,-151.436737	2.31	11.35	47182	29.01	<0.1	ERR	<0.1	20.986	<1	14.53	0.85	165
5/2/17 10:57 AM	60.777206,-151.436584	2.34	11.34	47175	29.02	<0.1	ERR	<0.1	20.986	<1	350.68	2.83	164
5/2/17 10:58 AM	60.777381,-151.436447	2.33	11.35	47178	29.02	<0.1	ERR	<0.1	20.986	<1	39.05	2.12	167
5/2/17 10:59 AM	60.777553,-151.436325	2.3	11.34	47309	29.10	<0.1	ERR	<0.1	20.986	<1	58.84	2.2	173
5/2/17 11:00 AM	60.777713,-151.436203	2.3	11.33	47321	29.11	<0.1	ERR	<0.1	20.986	<1	3.13	2.03	180
5/2/17 11:01 AM	60.777854,-151.436111	2.29	11.34	47307	29.10	<0.1	ERR	<0.1	20.955	<1	348.74	2.98	188
5/2/17 11:02 AM	60.777988,-151.436004	2.29	11.33	47291	29.08	<0.1	ERR	<0.1	20.955	<1	337.5	1.88	196
5/2/17 11:03 AM	60.778118,-151.435897	2.29	11.33	47252	29.06	<0.1	ERR	<0.1	20.955	<1	40.03	2.68	204

ERR - CH₄ in air sensor suspected of being infiltrated by water. Measurements are not considered to be valid, representative CH₄ measurements
 NR – Instrument did not record a measurement at this time interval

Table B20: Preliminary Buoy Drift 1 May 2, 2017

Preliminary Data for May 2, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
5/2/17 11:04 AM	60.778232,-151.435806	2.3	11.34	47243	29.05	<0.1	ERR	<0.1	20.955	<1	151.73	2.25	213
5/2/17 11:05 AM	60.778358,-151.435745	2.31	11.34	47174	29.01	<0.1	ERR	<0.1	20.986	<1	20.09	0.87	223
5/2/17 11:06 AM	60.778495,-151.435653	2.3	11.35	47203	29.03	<0.1	ERR	<0.1	20.955	<1	341.87	2.62	235
5/2/17 11:07 AM	60.778625,-151.435562	2.29	11.35	47219	29.04	<0.1	ERR	<0.1	20.955	<1	5.45	2.03	246
5/2/17 11:08 AM	60.778739,-151.435485	2.3	11.33	47178	29.01	<0.1	ERR	<0.1	20.955	<1	343.7	2.11	256
5/2/17 11:09 AM	60.778861,-151.435409	2.29	11.34	47221	29.04	<0.1	ERR	<0.1	20.955	<1	338.4	2.48	268
5/2/17 11:10 AM	60.778968,-151.435348	2.28	11.34	47234	29.04	<0.1	ERR	<0.1	20.955	<1	344.65	1.4	278
5/2/17 11:11 AM	60.779075,-151.435302	2.29	11.34	47218	29.03	<0.1	ERR	<0.1	20.955	<1	297.81	2.9	289
5/2/17 11:12 AM	60.77917,-151.435287	2.28	11.34	47246	29.05	<0.1	ERR	<0.1	20.955	<1	9.29	2.14	299
5/2/17 11:13 AM	60.779277,-151.435272	2.29	11.34	47237	29.05	<0.1	ERR	<0.1	20.955	<1	5.24	2.42	310
5/2/17 11:14 AM	60.779354,-151.435272	2.28	11.35	47201	29.02	<0.1	ERR	<0.1	20.955	<1	303.13	2.4	318
5/2/17 11:15 AM	60.779434,-151.435241	2.29	11.34	47355	29.13	<0.1	ERR	<0.1	20.955	<1	330.61	1.61	326
5/2/17 11:16 AM	60.779495,-151.435241	2.29	11.36	47377	29.14	<0.1	ERR	<0.1	20.955	<1	20.96	1.79	333
5/2/17 11:17 AM	60.77956,-151.435272	2.29	11.34	47371	29.14	<0.1	ERR	<0.1	20.955	<1	351.82	1.96	340
5/2/17 11:18 AM	60.779624,-151.435317	2.28	11.34	47373	29.14	<0.1	ERR	<0.1	20.955	<1	54.31	1.24	348
5/2/17 11:19 AM	60.779678,-151.435379	2.32	11.34	47355	29.13	<0.1	ERR	<0.1	20.955	<1	356.46	1.18	355
5/2/17 11:20 AM	60.779705,-151.435409	2.3	11.35	47351	29.13	<0.1	ERR	<0.1	20.955	<1	349.63	1.7	358
5/2/17 11:21 AM	60.779731,-151.435485	2.29	11.34	47371	29.14	<0.1	ERR	<0.1	20.955	<1	312.97	2.46	362
5/2/17 11:22 AM	60.779769,-151.435562	2.3	11.34	47361	29.13	<0.1	ERR	<0.1	20.955	<1	296.86	1.31	367
5/2/17 11:23 AM	60.779766,-151.435668	2.28	11.33	47530	29.24	<0.1	ERR	<0.1	20.955	<1	208.37	1.16	368
5/2/17 11:24 AM	60.779769,-151.43576	2.32	11.34	47550	29.26	<0.1	ERR	<0.1	20.955	<1	263.74	1.53	370
5/2/17 11:25 AM	60.779773,-151.435897	2.32	11.33	47511	29.24	<0.1	ERR	<0.1	20.955	<1	252.35	1.09	372
5/2/17 11:26 AM	60.779762,-151.436004	2.31	11.33	47546	29.26	<0.1	ERR	<0.1	20.955	<1	270.96	0.88	373
5/2/17 11:27 AM	60.779754,-151.436157	2.29	11.32	47602	29.29	<0.1	ERR	<0.1	20.955	<1	231.21	1.09	375
5/2/17 11:28 AM	60.779716,-151.436294	2.32	11.32	47617	29.31	<0.1	ERR	<0.1	20.955	<1	275.22	3.27	373

ERR - CH₄ in air sensor suspected of being infiltrated by water. Measurements are not considered to be valid, representative CH₄ measurements
 NR – Instrument did not record a measurement at this time interval

Table B20: Preliminary Buoy Drift 1 May 2, 2017

Preliminary Data for May 2, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
5/2/17 11:29 AM	60.779685,-151.436416	NR	NR	NR	NR	<0.1	ERR	<0.1	20.955	<1	142.36	1.9	373
5/2/17 11:30 AM	60.779651,-151.436614	2.34	11.31	47639	29.33	<0.1	ERR	<0.1	20.955	<1	205.84	0.31	373
5/2/17 11:31 AM	60.779609,-151.436782	NR	NR	NR	NR	<0.1	ERR	<0.1	20.925	<1	256.76	2.46	373
5/2/17 11:32 AM	60.779537,-151.43695	2.32	11.31	47647	29.33	<0.1	ERR	<0.1	20.955	<1	188.04	1.75	370
5/2/17 11:33 AM	60.779476,-151.437164	2.33	11.31	47753	29.41	<0.1	ERR	<0.1	20.955	<1	111.92	2.62	369
5/2/17 11:34 AM	60.779415,-151.437408	2.33	11.31	47741	29.4	<0.1	<20	<0.1	20.955	<1	216.87	0.38	370
5/2/17 11:35 AM	60.779342,-151.437683	2.31	11.31	47740	29.39	<0.1	<20	<0.1	20.955	<1	232.94	5.38	371
5/2/17 11:36 AM	60.779258,-151.437942	2.29	11.32	47776	29.41	<0.1	<20	<0.1	20.955	<1	221.26	3.53	372
5/2/17 11:37 AM	60.779159,-151.438201	2.29	11.31	47773	29.41	<0.1	<20	<0.1	20.955	<1	242.59	1.44	372
5/2/17 11:38 AM	60.779041,-151.438491	2.33	11.31	47802	29.44	<0.1	<20	<0.1	20.955	<1	236.3	0.81	372
5/2/17 11:39 AM	60.778926,-151.438812	2.34	11.31	47819	29.45	<0.1	<20	<0.1	20.955	<1	243.87	3.24	375
5/2/17 11:40 AM	60.778804,-151.439163	2.32	11.30	47852	29.47	<0.1	<20	<0.1	20.955	<1	197.49	0.98	380
5/2/17 11:41 AM	60.778671,-151.439498	2.3	11.30	47870	29.48	<0.1	<20	<0.1	20.955	<1	221.69	0.24	385
5/2/17 11:42 AM	60.778541,-151.439895	2.29	11.31	47907	29.50	<0.1	<20	<0.1	20.955	<1	243.7	2.38	394
5/2/17 11:43 AM	60.778388,-151.440231	2.3	11.30	47916	29.51	<0.1	<20	<0.1	20.955	<1	220.73	2.94	401
5/2/17 11:44 AM	60.778244,-151.440612	2.29	11.31	47921	29.51	<0.1	<20	<0.1	20.955	<1	212.4	3.42	411
5/2/17 11:45 AM	60.778083,-151.441024	2.31	11.31	47945	29.53	<0.1	<20	<0.1	20.955	<1	218.22	2.62	424
5/2/17 11:46 AM	60.777912,-151.44139	2.31	11.30	47928	29.52	<0.1	<20	<0.1	20.955	<1	214.56	1.35	436
5/2/17 11:47 AM	60.777732,-151.441833	2.32	11.31	47934	29.53	<0.1	<20	<0.1	20.955	<1	242.44	3.92	452
5/2/17 11:48 AM	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
5/2/17 11:49 AM	60.777412,-151.44252	2.32	11.30	47939	29.53	<0.1	<20	<0.1	20.955	<1	231.01	2.07	480
5/2/17 11:50 AM	60.777339,-151.442703	NR	NR	NR	NR	<0.1	<20	<0.1	NR	<1	231.27	1.42	488
5/2/17 11:51 AM	60.777023,-151.443328	2.32	11.31	47900	29.5	<0.1	<20	<0.1	20.925	<1	214.82	1.79	517
5/2/17 11:52 AM	60.776664,-151.444137	2.33	11.30	47917	29.52	<0.1	<20	<0.1	20.955	<1	228.43	6.61	559
5/2/17 11:53 AM	60.776439,-151.444656	2.34	11.30	47959	29.55	<0.1	<20	<0.1	20.955	<1	224.16	4.4	587

ERR - CH₄ in air sensor suspected of being infiltrated by water. Measurements are not considered to be valid, representative CH₄ measurements
 NR – Instrument did not record a measurement at this time interval

Table B20: Preliminary Buoy Drift 1 May 2, 2017

Preliminary Data for May 2, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (µS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
5/2/17 11:54 AM	60.776176,-151.445159	2.35	11.30	47928	29.53	<0.1	<20	<0.1	20.955	<1	231.81	1.74	616
5/2/17 11:55 AM	60.775924,-151.445724	2.35	11.29	47915	29.52	<0.1	<20	<0.1	20.955	<1	219.16	1.38	649
5/2/17 11:56 AM	60.775661,-151.446319	2.34	11.29	47900	29.51	<0.1	<20	<0.1	20.925	<1	224.55	4.79	685
5/2/17 11:57 AM	60.775394,-151.446868	2.33	11.30	47944	29.53	<0.1	<20	<0.1	20.955	<1	223.88	2.37	719
5/2/17 11:58 AM	NR	NR	NR	NR	NR	<0.1	<20	<0.1	20.925	<1	216.95	1.44	NR
5/2/17 11:59 AM	60.774776,-151.448059	2.35	11.30	47943	29.54	<0.1	<20	<0.1	20.925	<1	229.64	1.07	797
5/2/17 12:00 PM	60.774501,-151.448608	2.35	11.30	47925	29.53	<0.1	<20	<0.1	20.925	<1	192.59	4.72	834
5/2/17 12:01 PM	60.774204,-151.449218	2.35	11.30	47970	29.56	<0.1	<20	<0.1	20.955	<1	225.24	1.72	875
5/2/17 12:02 PM	60.773845,-151.449874	NR	NR	NR	NR	<0.1	<20	<0.1	20.925	<1	238.75	2.11	922
5/2/17 12:03 PM	60.773529,-151.450439	2.35	11.30	47953	29.54	<0.1	<20	<0.1	20.955	<1	208.91	2.88	962
5/2/17 12:04 PM	60.773117,-151.451202	NR	NR	NR	NR	<0.1	<20	<0.1	NR	<1	214.49	2.01	1018
5/2/17 12:05 PM	60.772808,-151.451766	2.35	11.30	47944	29.54	<0.1	<20	<0.1	20.955	<1	217.96	3.14	1059
5/2/17 12:06 PM	60.772308,-151.452667	NR	NR	NR	NR	<0.1	<20	<0.1	NR	<1	227.78	4.09	1127
5/2/17 12:07 PM	60.771949,-151.453414	2.35	11.30	47916	29.52	<0.1	<20	<0.1	20.955	<1	224.03	2.66	1180
5/2/17 12:08 PM	60.771568,-151.454132	2.34	11.30	47955	29.54	<0.1	<20	<0.1	20.955	<1	206.13	3.12	1234
5/2/17 12:09 PM	60.771003,-151.455184	NR	NR	NR	NR	<0.1	<20	<0.1	20.925	<1	232.64	6.11	1314
5/2/17 12:10 PM	60.770614,-151.455947	NR	NR	NR	NR	<0.1	<20	<0.1	20.925	<1	212.81	4.88	1371
5/2/17 12:11 PM	60.770347,-151.456436	2.35	11.30	47953	29.54	<0.1	<20	<0.1	NR	<1	209.61	3.92	1408
5/2/17 12:12 PM	60.769905,-151.457305	2.35	11.30	47943	29.54	<0.1	<20	<0.1	20.925	<1	224.47	3.79	1474
5/2/17 12:13 PM	60.769508,-151.458084	2.34	11.30	47944	29.54	<0.1	<20	<0.1	20.925	<1	228.34	3.59	1533
5/2/17 12:14 PM	60.769069,-151.458923	2.33	11.30	47963	29.55	<0.1	<20	<0.1	20.925	<1	213.08	2.9	1597
5/2/17 12:15 PM	60.768627,-151.459747	2.33	11.30	47916	29.52	<0.1	<20	<0.1	NR	<1	233.7	5.16	1661
5/2/17 12:16 PM	60.768173,-151.460617	2.34	11.31	47907	29.51	<0.1	<20	<0.1	NR	<1	234.47	3.11	1728
5/2/17 12:17 PM	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
5/2/17 12:18 PM	60.767707,-151.461486	2.35	11.31	47942	29.54	<0.1	<20	<0.1	20.925	<1	201.77	2.22	1796

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Table B20: Preliminary Buoy Drift 1 May 2, 2017

Preliminary Data for May 2, 2017 Air/Water Interface Buoy Events													
AKDT	Location	Temp (C)	DO (mg/L)	Specific Conductance (μS/cm)	Salinity (PSU)	Dissolved CH4 (mg/L)	CH4 (air) (ppm)	CO2 (%Vol)	Oxygen (%Vol)	LEL (% Vol)	Course (Degrees)	Speed (MPH)	Distance From Leak (Meter)
5/2/17 12:19 PM	60.767219,-151.462387	2.34	11.30	47947	29.54	<0.1	<20	<0.1	20.925	<1	239.12	6.09	1866
5/2/17 12:20 PM	60.766548,-151.463668	NR	NR	NR	NR	<0.1	<20	<0.1	20.925	<1	201.79	3.31	1966
5/2/17 12:21 PM	60.766021,-151.464553	2.36	11.31	47975	29.56	<0.1	<20	<0.1	20.925	<1	211.07	5.07	2039
5/2/17 12:22 PM	60.765495,-151.46553	NR	NR	NR	NR	<0.1	<20	<0.1	20.955	<1	219.93	5.05	2116
5/2/17 12:23 PM	60.764949,-151.466537	2.36	11.30	47986	29.57	<0.1	<20	<0.1	20.925	<1	230.62	7.5	2196
5/2/17 12:24 PM	60.764415,-151.467514	NR	NR	NR	NR	<0.1	<20	<0.1	20.925	<1	224.61	5.61	2274
5/2/17 12:25 PM	60.763545,-151.469055	NR	NR	NR	NR	<0.1	<20	<0.1	NR	<1	213.88	5.7	2399
5/2/17 12:26 PM	60.763183,-151.46968	2.34	11.30	47978	29.56	<0.1	<20	<0.1	20.925	<1	230.08	6.94	2450
5/2/17 12:27 PM	60.762844,-151.47026	NR	NR	NR	NR	<0.1	<20	<0.1	20.925	<1	209.06	5.2	2498
5/2/17 12:28 PM	60.762252,-151.471267	2.33	11.31	47966	29.55	<0.1	<20	<0.1	20.925	<1	208.47	4.31	2582
5/2/17 12:29 PM	60.761646,-151.472244	2.34	11.31	47966	29.55	<0.1	<20	<0.1	20.925	<1	221.16	6.38	2665
5/2/17 12:30 PM	60.761028,-151.473266	2.33	11.31	47961	29.55	<0.1	<20	<0.1	20.925	<1	204.27	3.87	2751

ERR - CH₄ in air sensor suspected of being infiltrated by water. Measurements are not considered to be valid, representative CH₄ measurements
 NR – Instrument did not record a measurement at this time interval

May 3, 2017 Report
Hilcorp Cook Inlet Wildlife Surveys
By Wildlife Observer, Responder, IBR

I arrived at Ross Aviation at 6:30 am, and took Hilcorp charter from Anchorage to Kenai, landing in Kenai about 7:00 am. I confirmed my return flight with Hilcorp logistics, and picked up a Hilcorp pool car at the Kenai hangar. Weather was breezy, partly cloudy, with no ice in the inlet.

I ate breakfast, and checked for any updated marine bird sightings in the upper Cook Inlet area from eBird.org and the AK Birding listserv but there were none. Spring migration is well underway with lots of waterbirds and shorebirds recorded on the southern Kenai Peninsula and wetlands.

I arrived at OSK helipad about 10:30 am with CISPRI PSO. We began the survey at 11:05 am. Predicted slack tide was 11:22 am, but at Platform A it was closer to 11:45 am. There was no ice in the survey area, and the seas were choppy with good visibility (see photo). There was no gravel bar area exposed in sight. I sat on the outside circling window as we made clockwise circles around the leak site. We were able to fly at 300' ASL. The outer ending GPS point (west side) was 60 50.0169N and 151 33.3902W. I saw 6 unidentified gulls in 3 different groups in the survey area. CISPRI PSO saw 1 of those gulls from the inside circling window. See data sheet as of May 3 for more details.

I departed Kenai at 3 pm on the Twin Otter, and arrived at Ross Aviation hangar in Anchorage about 4 pm, with a stop at Beluga.

This was the last scheduled wildlife observation flight for the Platform A methane leak area.

Cook Inlet Hillcorp Pipeline Surveys

	Date	Bird Obs	Start Time	End Time	Slack Tide Time	Tide Loc	Approx Survey Speed (kts)	Approx Survey Alt (ft)	Approx Area Obs (sq mi)	% Open Water	Beaufort Sea State	Swell	Nikiski Weather Time	Air Temp (deg F)	Wind Speed (kts)	Wind Dir	Visib (mi)	Cloud Cover (%)	Precip (in)	Pilot	Marine Mammal Obs	Comments
1	3/9/2017	flight data sheet not completed for March 9, 2017																				
2	3/17/2017	IBR	1505	1550	1513	Nik	85	500	15	<25	0	0	1415	18.5	6.8	ENE	100+	0	0	TP	CISPRI PSO	No wildlife observed
3	3/20/2017	IBR	1010	1120	1028	Nik	85	500	20	<25	0	0	1135	26.4	4.3	NNW	100+	5	0	unk	CISPRI PSO	No wildlife observed
4	3/22/2017	IBR	1305	1400	1311	Nik	85	500	20	25-50	0	0	1413	31.3	2.5	ESE	100+	0	0	Joe	CISPRI PSO	No wildlife observed. Approx. 20% open water around leak site. Slight swell seen under ice near leak per WC.
5	3/31/2017	IBR	1445	1538	1437	Nik	85	350	see GPS	25-50	2	<1	1430	31.3	15.2	ENE	50+	100	0	Joe	CISPRI PSO	1 gull and 1 raven seen by PSO and Pilot in survey area.
6	4/5/2017	IBR	1315	1410	1303	Nik	60-70	300-400	see GPS	>75	2	1	1215	35.2	8.7	ENE	50+	100	0	TP	CISPRI PSO	No wildlife observed
7	4/7/2017	IBR	1505	1605	1515	Nik	60	360	see GPS	99	2	1	1617	37.2	3.3	NNE	100+	50	0	TP	CISPRI PSO	One flying gull in survey area.
8	4/12/2017	IBR	1225	1320	see narrative	Nik	78	380	see GPS	99	0	0	1145	39.7	6.1	WNW	100+	0	0	TP	CISPRI PSO	No wildlife observed
9	4/19/2017	IBR	1106	1254	1120	Nik	72	350	25	99	2	1	0.44444	39	4	N	100+	0	0	EH	CISPRI PSO	1 Herring Gull flying N; 2 Mew Gulls flying S; 1 Leach's Storm Petrel W; 10 Glaucous-winged Gulls flying north
10	4/21/2017	IBR	1230	1400	1352	Nik	77	450	20	100	1	1	1135	46	4.5	ENE	100+	30	0	TC	CISPRI PSO	2 Glaucous-winged Gulls flying S to N thru middle; 3 Mew Gulls sitting between A and C platform first three circles, then flew away; 100 Geese flying N to S on the West edge of area, about 1,000 feet; 3 Glaucous-winged gulls flying next to shore by Helipad as we landed.
11	4/26/2017	IBR	1134	1234	1142	Nik	80	462	see GPS	100	2	<1	0.4875	41.9	4.4	NW	100+	90	0	unk	CISPRI PSO	1 gull flying near dock; 1 gull perched on gravel island; 2 large shorebirds (?) flushed from floating debris; 1 raven flying past. Possibly additional unidentified birds seen by pilots.
12	4/28/2017	IBR	1145	1245	1345	Nik	88	460	see GPS	100	1	negl.	1403	43.2	4.2	ENE	75	60	0	unk	CISPRI PSO	2 gulls, flock of 20 shorebirds, 2 possible WWSC, 1 possible ARTE, and 1 Bald Eagle.
13	5/1/2017	IBR	1530	1630	1600	Nik	72	330	see GPS	100	2-3	1	1430	45.3	17.3	E	50-75	100	sprinkles	Chris	CISPRI PSO	Less gravel exposed. 5 unidentified gulls seen flying.
14	5/3/2017	IBR	1105	1155	1145	Nik	85	300	see GPS	100	2-3	1-2	1027	41.4	12.6	ENE	100	50	0	Chris	CISPRI PSO	5 unidentified flying gulls seen in 3 groups.

Cook Inlet Operations - Protected Species Observer Effort Log

Project ID: DSO H.1 corp

Name: *CISPRI PSO*

Initial: PSO

Vessel Name: Harbor Helo

Effort Log Page #: **MMO-010**[illegible]

Photograph Log



Photo was taken on 5-3 in the vicinity of the leak with a view of Platform A. Flight circles are approximately 0.5 miles apart. The still water has been conducive to detecting flight or dive movements of wildlife.

ATTACHMENT B
WATER QUALITY SAMPLING SUMMARY REPORT

ADDITIONAL SAFETY DOCUMENTATION

DAILY JOB REPORT

Directions: *Note problems encountered, RFI's, verbal communications with Client's representative, change order work performed.
Note any important events
Send a copy via fax to Nikiski office by 900 am.*

Work By PEAK:

The work performed by 1 PEAK employee (*Safety Professional I*) was to provide HSE support to the personnel obtaining water samples for the Hilcorp Pipeline Gas Leak. HSE support included: JSA, pre-job safety meeting, permit to work, continuous monitoring of three 4-gas meters and continuous safety support.

Work by Subcontractors:

Work performed by 2 subcontractors, was that of water sampling by 2 SLR employee and 1 Kinetic Lab employees.

Safety Topic/Injury's

JSA and permit to work were completed for this job. Copy of JSA/permit to work is attached with this daily job report.

Comments:

Time line of events for this job are attached in a word document to this daily job report.

Supervisor

Safety Professional

Signature

to

Report No. 9

Peak Job No. 23054 Date 5/2/2017

Job Name HSE support for water sampling for Gas Pipeline Leak

[illegible]

The follow is a list of events that took place for the Hilcorp pipeline gas leak air water interface sampling and acoustic testing on Sunday 5-2-2017:

0800 – JSA and pre-job safety meeting completed

0815 – Depart Port aboard the Champion owned and operated by OMSI

0815 – Weather noted: Overcast, wind at 20 knots, 4-5 foot seas and temperature at 46* F.

0845– Three 4-gas meters were taped to wooden mop handles and taped to the railings of the vessel. The height of all the gas meters ranged between 5'6" and 6'0". One was placed at the bow, one was placed towards the front deck on the portside of the vessel and one was placed mid-deck on the starboard side of the vessel. The monitors were turned on at this time.

0930 – First water collect wit 0% LEL on gas meters. (side of vessel)

1030 – First water sample buoy and air water interface with 0% LEL on gas meters. (side of vessel)

1115 –Second water collect and second sample buoy with 0% LEL on gas meters. (side of vessel)

1300 – Monitors off and headed back to port.

1343 – Arrived to port and close out of Permit to Work.

There were no injuries/incidents and safety was a focus for all personnel performing today's tasks. Proper use of safety toe boots, gloves and life vests were noted throughout all tasks.

A focus on fall overboard safety and crane safety with overhead items was a focus today with the rough seas and the equipment swinging a decent amount from the seas.



Permit to Work (PTW) / Job Safety Analysis (JSA)

JSA's should be considered prior to any work. JSA's are mandatory for that require the use of Hilcorp Alaska's Permit to Work system.

DATE: 5-2-17 START TIME: 0800 END TIME: 1600

FACILITY: N/A LOCATION / AREA: Cook Inlet msb

PROJECT DESCRIPTION: methane pipeline leak
water sampling & water air interface

CONFINED SPACE ENTRY REQUIREMENTS:

The operations team and work team have evaluated the confined space and agree that none of the following conditions exist and a Confined Space Entry Permit is not required. Operations Lead or Permit Issuer Initials: _____

- 1) The space does not contain any type of hazardous atmosphere.
- 2) The space does not have the potential to entrap or engulf an entrant.
- 3) The space does not contain any other serious safety or health hazard.

Emergency Contact Info

Area controller: Vessel Captain

Safety: Hilcorp Safety Professional

Environment: Hilcorp Environmental Specialist

Emergency Muster Area: Deck of vessel

GENERAL SAFETY CONSIDERATIONS

	Y	N	N/A
Are Standard Operating Procedures available and being followed?	<input checked="" type="checkbox"/>		
Do personnel have proper tools/equipment for the job?	<input checked="" type="checkbox"/>		
Are tools/equipment in good condition/inspected?	<input checked="" type="checkbox"/>		
Is there a planned escape route?	<input checked="" type="checkbox"/>		
Are personnel aware of the location of First Aid supplies?	<input checked="" type="checkbox"/>		
Have the emergency notification procedures been covered with employees?	<input checked="" type="checkbox"/>		
Has Hilcorp EH&S been notified 72 hrs. prior to Confined Space Entry projects?			<input checked="" type="checkbox"/>
Are all personnel trained/ certified to use equipment/ engage in task?	<input checked="" type="checkbox"/>		
Are all personnel donning appropriate PPE?	<input checked="" type="checkbox"/>		
Will this project create a hazard to others in the vicinity?			<input checked="" type="checkbox"/>
Do all personnel understand correct incident/spill reporting?	<input checked="" type="checkbox"/>		

Additional Permits Required: ☐ Hot Work ☐ Confined Space Entry ☐ Isolation of Hazardous Energy ☐ Excavation & Trenching

HAZARD CONTROL INDEX (THIS LIST IS NOT EXHAUSTIVE)

SLIPS/TRIPS/FALLS <input checked="" type="checkbox"/> Clean surfaces (housekeeping) <input type="checkbox"/> Barricade <input type="checkbox"/> Focus on path <input type="checkbox"/> Use alternate route <input type="checkbox"/> Relocate equipment/project <input type="checkbox"/> Examine scaffolding condition <input checked="" type="checkbox"/> Examine handrail condition FALLS FROM ELEVATION (4'+) <input type="checkbox"/> Move work to ground level <input type="checkbox"/> Ladder inspections <input type="checkbox"/> Proper ladder material/placement <input checked="" type="checkbox"/> Additional PPE (Fall Protection)	PINCH POINTS/SHARP OBJECTS <input type="checkbox"/> Proper guarding <input type="checkbox"/> Proper body placement FIRE/EXPLOSION <input type="checkbox"/> Permitting <input checked="" type="checkbox"/> Air testing/monitoring <input type="checkbox"/> Remove combustible/flam materials <input type="checkbox"/> Fire watch <input type="checkbox"/> Fire extinguishers <input type="checkbox"/> Additional PPE HIGH NOISE LEVELS <input type="checkbox"/> Relocate work <input type="checkbox"/> Additional PPE (Hearing protection etc.)	ENERGIZED EQUIPMENT <input checked="" type="checkbox"/> Guarding <input type="checkbox"/> Proper body placement <input checked="" type="checkbox"/> No loose clothing REPETITIVE MOTION <input type="checkbox"/> Proper technique/tools <input type="checkbox"/> Ask for assistance <input type="checkbox"/> Work/rest schedule PRESSURE <input type="checkbox"/> Communication <input type="checkbox"/> Barricading <input type="checkbox"/> Shielding <input type="checkbox"/> Proper body placement <input type="checkbox"/> Block & bleed protocol	ELECTRICAL SHOCK <input type="checkbox"/> Testing <input checked="" type="checkbox"/> Grounding <input type="checkbox"/> Equipment shielding/condition <input type="checkbox"/> GFCI's <input type="checkbox"/> Examine electrical clearances LIFTING/PULLING/PUSHING <input checked="" type="checkbox"/> Utilize right tools for job <input type="checkbox"/> Proper technique <input type="checkbox"/> Smaller/lighter loads <input type="checkbox"/> Examine path <input type="checkbox"/> Use alternate route <input type="checkbox"/> Work rest schedule	LOCK-OUT/TAG-OUT CONDITIONS <input type="checkbox"/> Electrical isolation <input type="checkbox"/> Pressure isolation <input type="checkbox"/> Energized equipment isolation <input type="checkbox"/> Fire/explosion isolation HAZARDOUS CHEMICALS <input type="checkbox"/> Consult MSDS <input type="checkbox"/> Label/store containers correctly <input type="checkbox"/> Spill prevention considered <input type="checkbox"/> Additional PPE (Goggles etc.) ATMOSPHERIC <input type="checkbox"/> Respirators <input checked="" type="checkbox"/> Testing/monitoring
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WORK TEAM LEADER (print): Environmental Sampler

Signature: Environmental Sampler

PERMIT APPROVER (print): Safety Professional

Signature: Safety Professional

AREA CONTROLLER (print): Vessel Captain

Signature: Vessel Captain

Revalidation or Extension Time (4 Hour Max):

Permit Approver (print): _____ Time: _____

Signature: _____

Close Out Signature: Environmental Sampler

Work Team Leader: Environmental Sampler

Area Controller: Vessel Captain

Time: 1330 1343
Time: 1330 1343

HILCORP ALASKA, LLC: JOB SAFETY ANALYSIS (JSA)

JOB STEPS (Describe and number each step)	POTENTIAL HAZARDS ASSOCIATED WITH EACH JOB STEP (Identify each hazard with a CAPITAL letter)	CORRECTIVE ACTION(S) (Identify responsible person with initials)
1 Travel to location, retrieval & redeployment of equipment and travel to port	<p>A Heavy seas/wind - fall overboard</p> <p>B wind burn, items moving, falls</p> <p>C cool temps - frostbite, skin eye irritation, cold exposure</p> <p>D dangerous atmosphere - contact with increased LEL %</p>	<p>a Hand rails, floatation devices, pilot data, captain discretion, non-slip footwear, store items</p> <p>b Cold weather gear</p> <p>c Continuous monitoring w/ 3 H-gas meters</p>
2 Rigging Equipment	A Pinch points, crushing, cuts	a Identify pinch points, communication, cut resistant gloves, inspect prior to use
3 Deployment & retrieval of equipment	<p>A Falls overboard, trips</p> <p>B Caught - by</p> <p>C over head material, crush, struck-by</p>	<p>a Floatation device, keep path clear, tie off</p> <p>b Communicate, eye of sight on equipment</p> <p>c No working under items</p> <p>d Communication, hard hat safety use shoes, deck hand to run crane and help rig of deployment and retrieval.</p>

This JSA should be reviewed by everyone involved with the project. This JSA is not considered complete until everyone involved with the project signs below, along with any other contributing personnel. Should personnel need more space to complete the JSA, or if new hazards are presented due to changing conditions, an additional JSA form should be utilized and attached to these pages. Make notes on how the task can be performed in an even safer manner and keep JSA's on file so that they may be referenced in the future should a similar project be conducted.

INVOLVED PERSONNEL SIGNATURES:

Environmental Sampler

Environmental Sampler

Environmental Sampler

Safety Professional